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Original Contributions.

THEORIES MADE FACTS.

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During four or five years I have advanced the opinion that the positions of the deciduous teeth affect the permanent teeth, and that, therefore, any irregularities in the deciduous teeth should be corrected in order to prepare the way for the permanent teeth. If the deciduous teeth are brought to occupy their normal positions, the crowns of the underlying permanent teeth will naturally assume correct position and their roots will be formed in harmony.

To illustrate this theory I present three cases, seven, eight and ten years of age, which are under treatment, in order to show changes which have taken place within a year. These results have been obtained by means of very simple apparatus, but they are highly instructive to those who are interested in orthodontia. It should also be added that the effects of such operations reach much farther than would appear at first sight. Indeed, they are almost incredible, and few, if any, and those mostly physicians practicing largely among children, have yet begun to realize them.

Four years ago I had the honor of presenting before the Dental and Oral Section of the American Medical Association some observations upon two cases of orthodontia. This paper was discussed by several of the members, who seemed to express doubt as to whether operations in orthodontia performed upon the temporary teeth of children from five years old and upward could be of any permanent benefit, and whether they might not be injurious to the permanent teeth that are at that time in process of formation beneath. Since then doubt has been expressed as to the utility of moving the deciduous teeth, and whether such

movement could have any effect on the positions of the permanent teeth that have yet to erupt.

Attention is invited to the illustration of a child's skull, not far from normal (Fig. 1). It will be seen that the roots of the

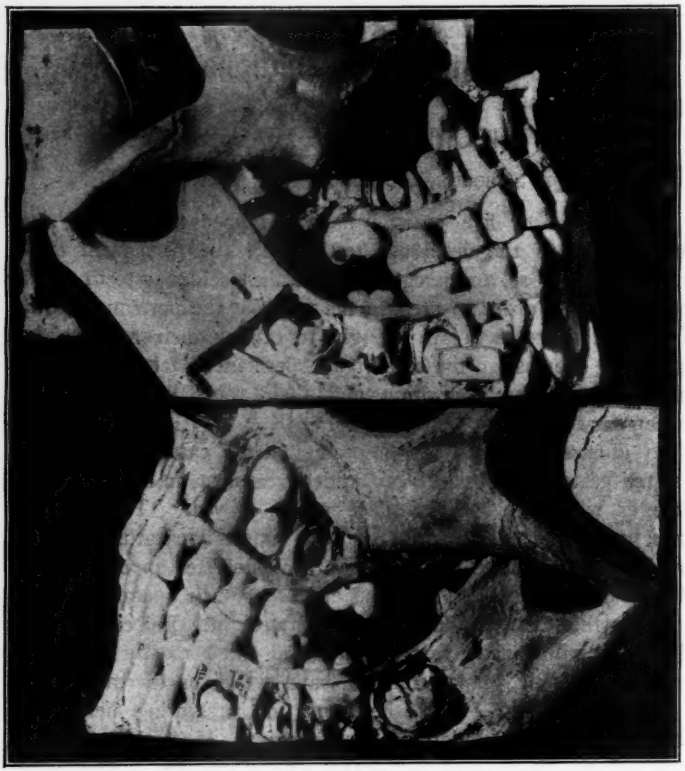


Fig. 1.

molars carry the permanent bicuspid crowns, which as yet have no roots, so thoroughly in their grasp that any movement of the former would naturally be imparted to the permanent teeth.

Three cases are presented for consideration, these being taken from among ten that have recently been under treatment, on all

of which I placed regulating apparatus in the early part of last year. None of these cases was seen during a period of four months or more; that is, from the time I finished adjusting the regulating apparatus until they were again presented for renewed treatment.

The first is that of Henry M., the younger brother of John and Louise M., whose cases were presented four years ago. Having just completed the arrangement of fixtures in his mouth to per-

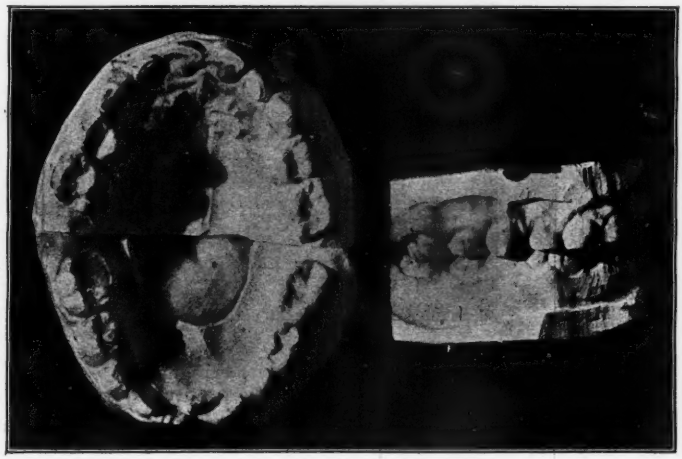


Fig. 2A. Fig. 2B.

mit of his going to Europe for several months, I will describe the procedure from the beginning up to this time.

Figs. 2 A and 2 B represent the mouth at six years of age.

The malarticulation of the temporary molars when closed shows that the permanent molars, if left to themselves, will erupt irregularly, while the left superior central incisor just appearing shows that the front permanent teeth are out of place.

Figs. 3 A and 3 B show the mouth at seven and one-half years of age.

The curious feature is here presented of two permanent molars erupted in the upper jaw, while not a trace is to be seen of any permanent molars in the lower jaw. At the same time

the right superior temporary lateral incisor has fallen out prematurely, causing a depression of the arch at that point and a wide separation of the permanent central incisors.

Fig. 3A.

At eight years of age the Ainsworth fixtures were placed on the temporary teeth to broaden the arches, both above and below, so as to give room for the eruption of the permanent

Fig. 3B.

teeth. Attached to the lingual sides of bands on the lower molars were two wire springs made after the Jackson pattern, with a stronger arch wire passing beneath the tongue, to which these

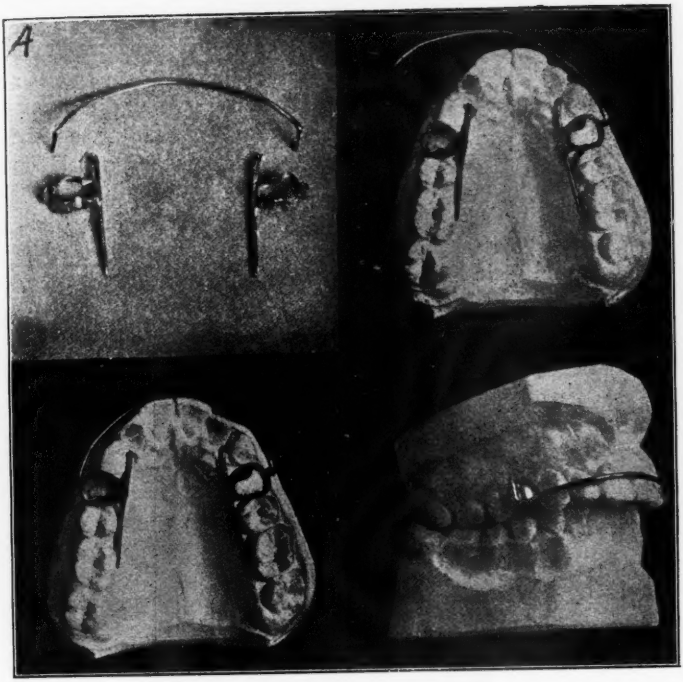


Fig. 4.

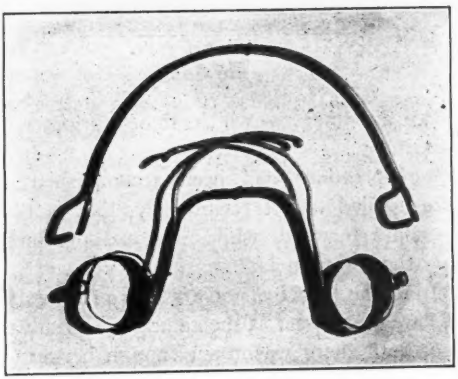


Fig. 5.

wire springs were tied with silk while the bands were being cemented to place. Figs. 4 and 5.

After the cement was fully set the silk was cut, releasing the springs, which then pressed forward lightly, but continuously, on the lingual surfaces of the lower incisors, and being held downward by small projecting lugs extending backward from bands cemented to the two lateral incisors, these wire springs could not slide upward on the inclined planes of the incisor teeth, but expended their force in a forward direction, moving the teeth gently

Fig. 6A.

but surely to the lines to which these spring wires had been previously bent.

After some spreading had been accomplished, intermaxillary elastics were applied to act reciprocally, that is to say, to draw the upper molars forward, while an equal pressure was exerted backward on the lower molars.

While getting the principal molars into proper articulation with each other, care was taken at the same time to advance the upper incisors also, until there was room enough between the first permanent molars and the incisors for all the bicuspids and cuspids to erupt easily, and until the lower incisors were formed into an

arch corresponding in shape and size with the arch drawn to the patient's measurements.

At this stage came a notification that the family was to go to Europe and would stay several months. On April 10, 1906, the proper appliances were in place to allow for an absence of several months, if necessary, patient at this time being nine years old. Figs 6A and 6B show the models of case as fixed in anticipation of this trip, the actual conditions being as follows: The principal molars have been brought into nearly correct articulation, and the arch at that point has been widened enough for his age.

The central incisors above and below have been advanced far

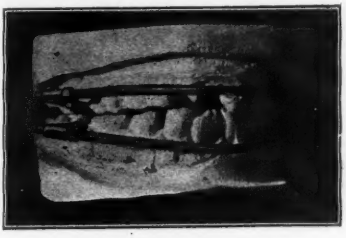


Fig. 6B.

enough from the molars to permit of the eruption of all the permanent teeth between them and the principal molars, and are themselves in almost correct position relative to each other. These spaces between the incisors and the permanent molars are maintained by wire arches passing around on the labial sides of the teeth above and below from molar to molar. Bands have been placed on the molars and horizontal tubes attached to these bands to receive the ends of the arches.

The arches have two nuts on each end holding them in place accurately, and also allowing for forward or backward movement in case of future need. The incisors are ligated to the arches by small ligature wires. The second upper temporary molars are banded and have wires soldered to the lingual sides of the bands, these wires extending forward along the gum line, touching all the remaining temporary teeth. On the lower jaw similar wires extend forward from the molar bands, taking the places of

the spring wires that served to advance the incisors. These inner wires, shaped as the perfect lower arch should be, are ligated to the outer arch with small ligature wires for the purpose of drawing the temporary teeth, together with the crowns of the permanent teeth beneath them, into their proper places in the arches.

Just here I will digress to answer the question that arises in the minds of many thoughtful students of these questions as to how one may know when the temporary teeth shall have reached their proper places in the arches.

Many years ago Dr. Bonwill discovered that a mathematical re-

Fig. 7A.

lation existed between the width of a permanent central, lateral and cuspid, and the entire arch, and from the measurements of these teeth he was able to construct a plan of the entire arch as it should be when normal. When thus normally arranged it is found that all the teeth growing in one jaw articulate with the teeth of the other jaw, so as to furnish the largest area of grinding surface to each other. The cusps, the sides of the cusps, and the sulci into which they fit, all combine to furnish not only the best masticating surfaces, but to form dental arches that for strength and durability cannot be equaled. The cusps of all the grinding teeth in such arches interlocking with the cusps and the sulci of their antagonists prevent any variation in position of any of the teeth, either laterally or mesiodistally.

Dr. Hawley of Columbus, O., recognizing these facts, adapted

this discovery of Dr. Bonwill to the use of the orthodontist, so that today, by measuring the width of one upper central incisor or one upper principal molar, we may approximate very nearly to the shape and size of the arch in which that tooth belongs, and may draw it upon paper so accurately that we may work to that arch with confidence. If there is any slight variation in the sizes of the various teeth in the same mouth and we work up to the

Fig. 7B. Fig. 7C.

model, nature will make all proper correction in the way of diminution and adjustment to type without assistance, and at the same time without any injury to size or strength or the adaptation of the arches to each other.

Now to return: When the upper temporary molars in this case fall out, together with the wires that are attached to them, the permanent molars and the central incisors will still be held in their proper relations to each other, and there will be room for the eruption of all the intervening permanent teeth. It will be noticed that the right upper lateral incisor is about one-quarter of an inch back of its normal position, and that it is being drawn

forward by means of a little cap swaged to fit and cemented to the tip of the tooth just appearing through the gum.

It was at this point that the temporary incisor was prematurely lost, causing the separation of the centrals.

When the lower temporary molars fall out the lower lingual wires, being soldered to the bands of the principal molars, are expected to remain and to continue ligated to the outer wire arch in such manner as to hold the lower incisors forward and in their

Fig. 8A. Fig. 8B.

proper positions, while at the same time serving as partial guides to the erupting permanent bicuspid teeth.

Therefore, when the lower arch of permanent teeth shall have erupted properly into normal positions, and there is room enough for the upper ones to erupt, we may expect the tongue and cheeks to serve as proper and sufficient guides to cause the latter to articulate properly with the lower arch.

The second of the three cases is a little girl, who was seven and one-half years of age when the apparatus was placed in position on July 15, 1905. Figs. 7 A, 7 B and 7 C.

I did not see the child again until November 11, 1905, when the arches were found in the condition shown in the illustration,

Fig. 9A.

Fig. 7 C, having gained in width a little more than one-fourth of an inch.

During the past winter torsion has been applied to the right

Fig. 9B.

lower lateral incisor and the two upper laterals. At the present moment the arches are as represented in the illustration, Fig. 8 B, and there is ample room for the eruption of all the remaining

Fig. 9C.

Fig. 9D.

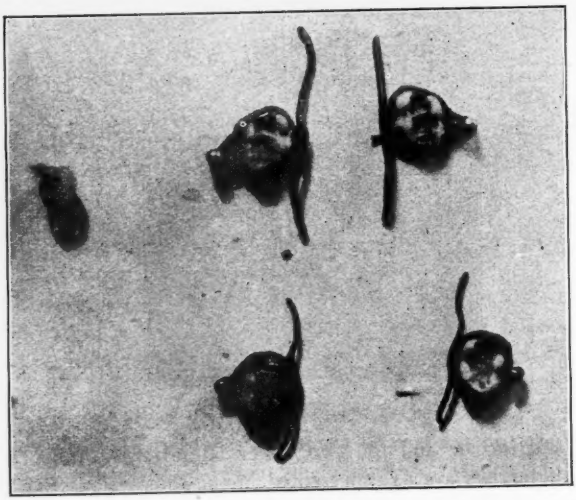


Fig. 10.

permanent teeth when they do come. Fig. 8 A is placed alongside for comparison with the present condition, eleven months later.

The little patient's health has improved markedly during the entire time that the apparatus has been in place. She has increased in weight and strength, and her rosy cheeks and bright manner indicate no ill effects, but on the contrary great gain. There has been an expansion not only of the dental arches, but of the contiguous parts, upon which health, vigor, clear speech and full breathing depend so much.

Fig. 11A.

We now come to the models illustrating case of Miss R. B. at eight years old, Figs. 9 A and 9 B, this being the third case, and upon whose temporary teeth appliances were placed May 29, 1905, two years later when she was ten years old. She was not seen again until November 24, 1905, when I took impressions. Fig. 9 C represents the mouth as it was in May when the appliances were first placed, while Fig. 9 D represents it as it was November 24, 1905.

The change in the size of the arches during the intervening period, under the operation of the Ainsworth fixtures like those

mentioned in the preceding case, is plain to be seen. The increase in width between the principal molars is three-eighths of an inch, almost one centimeter. On December 7, 1905, these temporary molars became so loose that they had to be removed, taking with them the fixtures which had produced the spreading, Fig. 10.

I was soon able by means of caps swaged to fit the grinding ends of the upper principal molars, that were only partially through the gum, to get them into proper articulation with the lower molars, where they remain.

The incisors are being held forward by arches attached to the principal molars. The permanent teeth are, as may be seen by

Fig. 11B.

the illustrations, erupting into the mathematically described arch, into which they ought to come without further assistance, and this arch is one-fourth of an inch wider than the arch of temporary teeth with which we began operations.

Figs. 11 A and 11 B.

The growth and general development in health, appearance and vigor is very noticeable. The question has been asked if all the enlargement of these arches is to be attributed to the fixtures and no allowance made for growth.

For reply, I present Figs. 12 A and 12 B, models of the same mouth two years apart, one having been taken in May, 1903, the other in April, 1905; also Fig. 12 C of the same mouth, November 24, 1905, seven months later than Fig. 12 B.

The measuring marks on these models show no perceptible growth in two years, from 1903 to 1905, but nearly one centimeter

Fig. 12A.

Fig. 12B.

Fig. 12C.

of enlargement in the final seven months covered by the models.

Children requiring assistance in the development of their dental arches require it because of cessation, partial or complete, in their general development, and the irregularities in position of their teeth are but symptoms of a more radical difficulty in their physical condition.

The three children whose cases serve as illustrations for this paper assure me that they have experienced no pain whatever from the operations.

Let no one suppose that the apparatus which has produced the

Fig. 13.

effects exhibited in these cases can be carelessly applied and then carelessly left for six months, or even six weeks. Just as careful calculation of the force employed, and of the direction in which it should operate, has been made in these cases as was made in working out mathematically the charts which indicated the precise points to which each of the misplaced teeth was to be drawn.

In making the lower spring attachments, which later were utilized for the lingual retaining wires, after getting the desired width between the temporary molars, I cut off the incisors and cuspids from the models and replaced them in the advanced positions which they should occupy, which are a little forward of the

normal arch. To these lines my wires were bent, which consequently acted just so far, and no further.

In other cases I have employed spiral springs around the ends of the arches, ligating with wire the incisor and cuspid teeth to the arches, which had been accurately formed nearly on the same lines as used by Dr. Angle. The ends of these arches were screw-cut and nuts placed upon them just forward of the spiral springs. When the incisor teeth were accurately ligated to the arches, and the ends of the arches were placed in horizontal tubes attached to the anchor teeth, the nuts were turned down against the spiral springs, just exactly the distance that the incisor teeth should move forward.

A danger in long periods of waiting is that the patient may grow careless in the matter of cleansing the teeth, and, as a result, serious decay may occur. On the other hand, there is an advantage in long periods with the apparatus in place, in that nature may have time to overtake our corrective operations on the teeth and may advance to even an expansion of all the contiguous bones of the face, and, I believe, of the head also.

The relations of the superior dental arch to the contiguous bones of the head and face are shown in Fig. 13.

Dr. William B. Wood told me recently that he had had one youth, upon whose teeth I had placed regulating fixtures in March, 1906, under constant observation, and so accurately that he had been both measured and weighed every week since I commenced to move his teeth, and the results showed that the boy had never ceased to gain both in stature and weight since the day the fixtures were applied.

This boy of fifteen was undersized, having ceased for a time to grow; when, however, after treatment by Dr. Wood he once more began to grow, and these regulating fixtures were applied, his attending physician was naturally anxious to know whether anything was being done that would in any way interfere with the boy's healthy progress toward development. Fortunately, owing to this, a careful record was kept, without my knowledge, until the operation was completed, this showing the boy's exact condition from week to week during the whole period covered by the work of regulation.

THE REFLEXES OF DENTITION.

BY CHARLES HUNTER DUNN, M.D., BOSTON, MASS. READ BEFORE THE SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION, 1906, AND PUBLISHED BY COURTESY OF THE JOURNAL OF THE ASSOCIATION.

Dentition has assumed a position of varying importance in connection with the diseases of infancy. There is a period in medical history, perhaps about one hundred years ago, when dentition was considered the most important cause of infantile disease. Almost every disease to which infants are liable was attributed to the cutting of the teeth, and, at times, the mortality from dentition alone has been placed at as high a figure as 50 per cent. This view still plays an important part in the ideas of the laity. One hears constantly of heat rashes, of the dangers of the second summer, and one frequently meets with the inquiry on the part of the perplexed and anxious parent, "Is it the teeth?"

There has also been a period of reaction against this extreme view of the significance of dentition. All significance in producing morbid processes has been denied to the process of teething. Dentition was asserted to be a normal physiologic process, like the growing of hair, and the supporters of this view denied that such a normal physiologic process could possibly be the cause of any symptoms. It is probable that neither view is correct. Certainly there is no warrant for attributing all, or even a large majority, of the ills of infancy to teething. As our knowledge of the true etiology of various diseases and symptoms has progressed, it has become evident that in many of those formerly attributed to the process of cutting the teeth, dentition could not possibly be regarded as playing an important part. On the other hand, the view that a normal physiologic process can not possibly be a cause of morbid symptoms, is not in accordance with analogy to other normal physiologic processes, in which it is certain that numerous morbid symptoms can and do occur. Examples of such processes are puberty, pregnancy and the menopause.

It is an undoubted fact that the process of dentition can occur without any disturbance of the health whatsoever. Every one meets with such cases, and, perhaps, they form the majority in our practice. It is, on the other hand, equally true, that a great many cases

are seen in which diseases or morbid symptoms arise coincidently with the cutting of teeth. The occurrence of symptoms at such a time must be regarded either as mere coincidence, or as evidence of a casual connection between teething and the disease.

A great variety of symptoms and disease processes have been associated in time, and hence in causality, with the process of dentition. Restlessness, fretfulness, crying and disturbed sleep are fairly common. Moderate or high fever is seen at times. Gastrointestinal disturbances of all kinds are frequently attributed to teething, especially vomiting, diarrhea or colic. Signs of pharyngitis, laryngitis, tracheitis and bronchitis are not uncommon in the teething period. Even pneumonia has been diagnosed as due to the cutting of a tooth. Many nervous manifestations have been recorded at this time, such as laryngismus, spasmodic cough, squint, muscular twitching, tetany and convulsions. Skin diseases of various kinds, dermatitis, prickly heat, eczema and many other rashes have been observed associated with dentition. Further, there can be found in medical literature instances where such conditions as meningitis, encephalitis, various forms of paralysis, eye affections, ear affections, etc., have been attributed solely to this normal physiologic process.

The etiology of many of these conditions is now so thoroughly understood that we know that they can not be due to dentition, and that, therefore, their occurrence during the teething period must be due to mere coincidence. This being the case, many of those conditions of which the etiology is not so thoroughly understood may also be due to coincidence. The occurrence of such coincidences would not be very remarkable, as every one of these conditions occurs also frequently at a time when the process of teething is not going on, and it would be rather strange if they did not occur at a time when it is going on. The cases which do occur at this time naturally make more impression, and perhaps the difficulty of discovering a satisfactory cause contributes toward pushing the observer into the fallacy, *"Post hoc, ergo propter hoc."*

Nevertheless, the sum of clinical experience does not convince us that all the cases of association of symptoms with dentition is coincidence. Cases frequently occur in which the evidence is strongly the other way, and the repetition of such cases, with an absence of any satisfactory demonstrable cause, has led to the view held by

most authorities on the subject, that there are a certain number of conditions which are due in fact to dentition.

This being the case, there has been further discussion as to how a normal physiologic process like the cutting of a tooth actually causes these symptoms. The most simple, complete and attractive theory is the reflex theory. This is based on the numerous anatomic connections of the trigeminal nerve. The teeth are supplied by the branches of this nerve. The superior maxillary division, through its three superior dental branches, supplies the teeth and gums of the upper jaw, while the inferior dental, a branch of the inferior maxillary, supplies the teeth and gums of the lower jaw.

The trigeminal nerve, with its ganglia containing sympathetic and motor roots, is brought into close connection with the facial, the glossopharyngeal and the vagus nerves, and with the nerves controlling the movements of the eyeball and iris, and those controlling the salivary secretion. Also, its nucleus in the medulla is in close proximity to other important centers. Through these connections it is an easy matter theoretically to attribute the greatest variety of symptoms to irritation of the trigeminal nerve.

Simple and attractive as is this theory, there are great difficulties in the way of proving it. It is a matter which is practically incapable of experimental proof. The theory must rest entirely on clinical proof. This form of proof is always of doubtful validity. It requires the evidence of many and repeated clinical observations to create even a presumption of causal connection between the clinical conditions observed, and the existing condition of dentition. A large mass of statistics showing the frequency of certain symptoms during teething, as compared with that observed at other times, might be of some weight; there are, however, no satisfactory statistics of this kind. We are obliged to rely mainly on single or isolated clinical experiences, or on general impressions.

Most of the symptoms mentioned as occurring in dentition do not arise with sufficient frequency, and there is no strong evidence in favor of their being in any way connected with dentition. The respiratory disturbances, the skin exanthems and eye affections belong in this class. No one at the present day would regard the association of such definite diseases as pneumonia, meningitis, encephalitis or paralysis with teething as being in any way causally connected with dentition. Their etiology is too well known. There

are, however, certain other symptoms which are associated with dentition with great frequency, and which, from their nature, give more plausibility to the reflex theory of their origin.

First, it frequently happens when a tooth is piercing the gum, that a child becomes very restless, fretful, with disturbed sleep, crying out, and sometimes beating its head against the side of the crib. The baby frequently thrusts its hands into its mouth and gives other indications of suffering a great deal of irritation in its gums. There is increased salivary secretion and loss of appetite. These symptoms often occur with such great persistency with each tooth cut, and are so immediately relieved by lancing the tense gum over the crown of the tooth, that there can be little doubt that they are due to dentition. They are not, however, strictly reflexes. The restlessness, disturbed sleep and crying are probably due to the pain which the child is suffering. The increased salivary secretion is probably reflex.

Similar symptoms occur at times, though perhaps less frequently, when no cause for irritation can be found in the mouth. In this case the cause of the irritation probably lies at the root of the tooth; in practice in this class of case gum lancing is not indicated, but rather the administration of small doses of the bromids.

Fever is another symptom frequently seen during the teething period. There may be a moderate rise of temperature, or the temperature may rise suddenly as high as 105° F. Sometimes this rise of temperature is attended by the symptoms just mentioned, sometimes by no other symptoms. Careful examination fails to determine any other cause for the fever. This symptom frequently occurs at a time when there is not even any visible sign of irritation in the mouth, but seems to be due to irritation at the root of the tooth. The absence of any other cause for the rise of temperature in these cases, and the fact that it recurs when a new tooth becomes active, and subsides when it appears, are the evidences of its being a reflex phenomenon connected with dentition.

I have recently seen a case of this kind. The baby has now cut six teeth. With each one the story was the same. The mother found the baby suddenly feeling very hot, and immediately took its temperature, finding it as high as 104° or 105° F. In other respects the child seemed as well as ever, and there was even no loss of appetite. After persisting 24 to 48 hours, the temperature again

fell to the normal, and in a short time the tooth appeared, the actual piercing of the gum being unattended by any symptoms.

One of the most important reflexes of dentition is the ear reflex. There occur symptoms of disturbance in the ear arising during dentition, consisting in pain, and sometimes going on to actual inflammation. The frequent occurrence of ear disturbance, and even of otitis media during the teething period, is so notable that the fact has probably been observed by every one practicing among infants. There is further evidence. We know that in these conditions of disturbance of the ear, there is actual congestion of the membrana tympani. There is a close nerve connection between the inferior dental nerve and the nerves governing the blood supply of the drum membrane. According to Woakes, this blood supply is derived from an artery which leaves the internal carotid in the carotid canal. The nerve fibers forming the carotid plexus at this point are directly connected with the otic ganglion, which also receives fibers from the inferior maxillary division of the trigeminal nerve. Thus there is a direct channel of nerve communication between the tooth and the blood supply of the membrana tympani, and it is easy to see how, as pointed out by Rotch, an irritation about a tooth could cause reflex disturbance of this blood supply.

As to the digestive disturbances, vomiting, colic and diarrhea, the evidence is less clear. These conditions are undoubtedly frequently associated with teething. On the other hand they occur so frequently in infancy that their simultaneous occurrence with dentition through coincidence would not be very remarkable. It is well known that the digestion is easily disturbed by nervous influences, as is evidenced by the conditions of nervous vomiting and nervous diarrhea, from other causes, as heat, cold, fright and various sources of irritation. Even a distinct lowering of the digestive power can be caused by nervous influences, as is seen by the great frequency of digestive disturbances in very hot weather. Cases occur in which a child has been taking and thriving on a certain food under conditions which insure practical constancy in composition of that food. Suddenly, coincidently with the cutting of a tooth, comes a disturbance of digestion, and the infant can no longer take this same food without vomiting, colic, or more often diarrhea. When the tooth appears the digestive powers once more become normal. It seems justifiable to attribute this phenomenon to a reflex of dentition.

Less convincing is the evidence that certain nervous disturbances are due to teething. Muscular twitching, tetany and even convulsions occur during the cutting of a tooth. They are, however, conditions to which it is specially difficult to exclude other causes. While we can not deny the possibility that these symptoms are due to teething, there is little positive clinical evidence in support of their connection with this physiologic process.

To sum up: The commonest symptoms seen in dentition are not reflex, but due to pain. They may arise from the tooth cutting the gum, or from irritation at the root of the tooth. The majority of symptoms attributed to a reflex irritation from the tooth are probably mere coincidence. There is a strong probability, based on clinical experience, that dentition may cause fever, disturbances of the ear and disturbances of digestion. It may possibly cause certain nervous disturbances.

DISCUSSION.—*Dr. Thomas M. Rotch:* A large number of physicians say that they have never seen a case in which a gum should be lanced, and, therefore, that there are no reflex symptoms from this source. Many may live long and yet not see certain phases and manifestations, whether of nervous origin or organic. If a certain number of men assert they have seen such cases we should be influenced by those who have seen as well as by those who have not. There is no question but that the habit in the past of lancing all gums was a mistake and that this practice will not always relieve symptoms. Again, there are certain cases which call for lancing, and in which the symptoms are relieved thereby.

I think there are reflex symptoms during the teething period. This can not be proved anatomically, as in the first class of cases, but from analogy and general investigation I feel just as sure in diagnosis as in any of the nervous manifestations in infants which we cannot explain. In the unbalanced and undeveloped nervous system of a baby the least little pain or feeling of discomfort will produce symptoms, and this may not only make it cry, but give any kind of nervous symptom, while in the adult it would have no effect. In some individuals a slight toothache will cause severe disturbance, and yet there may be nothing actually organic. So in infancy there may be a symptom-complex when the nervous equilibrium is easily disturbed.

If there are pulmonary symptoms, rapid respiration, alæ nasi di-

lated, and signs of pneumonia, and they are entirely relieved on blowing out the Eustachian tube, these are analogous cases, and yet it could not be said that there must be some pulmonary involvement. As the nervous system is so easily thrown out of gear, there may be vomiting, diarrhea, pulmonary symptoms, congestion of the ear, pain, otitis media. All may be proved to be of infectious origin. The fact remains that there is congestion at the time of the development of the tooth. Also, when there is congestion of the middle ear in a baby, with the open petrous suture, and the intimate relation between the meningeal and ear vessels, there may be convulsions, twitching and various nervous symptoms, nothing serious and all passing away with a dose of bromid of potash, reducing the congestion.

Dr. A. C. Cotton, Chicago: It was not strange when all the disorders of infancy coincident to the period of teething were attributed to teething, greatly to the detriment of the infant, and no doubt increasing infant mortality, that in the rebound the profession should go to the opposite extreme, until the late Dr. Christopher was in the habit of telling mothers that teething was never known to produce anything but teeth. It is well known that other physiologic processes produce reflex symptoms, parturition, gestation, menstruation. In my opinion there has been no disorder attributed to teething that may not have been due to that cause. Pneumonia might be due to teething.

One cannot convince a mother that the serious discomfort so manifest in a baby preceding the eruption of each tooth is due to any other cause. Again, if not due to teething, to what is it due? Indigestion, reflexes from other parts? Remedies have been addressed to digestive disturbance in vain, until finally the eruption of a tooth was soon followed by convalescence. It would seem that the trend of opinion is backward toward reflex disturbance of dentition, and there are reflex disturbances without anatomic explanation.

Dr. Vida Latham, Chicago: Dentition is not in all cases a physiologic condition. If hyperemia is a physiologic condition, then certainly dentition is. If a section of a child's head during the period of dentition be examined microscopically, evidence of very active hyperemia will be found. The irritant is present by pressure on the nervous system; hyperemia is present, and if con-

tinued long enough may result in a diseased condition, even ulceration or necrosis, or the happy termination of resolution. Near the apex, about one-fourth of an inch to one side, may be found an area of round-celled infiltration; after a while these cells become absorbed, and they leave an area of weakness. In other words, the apex of the tooth has a line of weakened resistance; it rotates on its axis and points to the cavity. This can be demonstrated. If neuritis is present there is nothing so destructive to the nervous system of the patient, nothing so likely to be a cause for producing inflammation, the lowering of vitality and a profuse salivation by stimulation of the glands.

From these there result dilated stomach, pressure on the solar plexus and decomposition, either by drowning of the gastric bacteria, so that we have no immunity, or if the patient should have an attack of emesis, concentration takes place, possibly an increase in the bacteria, and this can very readily produce a growth of the pneumococcus, meningococcus, streptococcus, which is a common thing, and for which the breaking up of the mucous membrane gives a mode of entrance. In many cases the lymphatic glands are infected, the nasal mucous membrane may be infected, and sometimes otitis media results. In some cases bathing, stimulation and causing the tooth to erupt relieve the symptoms better than any medicine, except, of course, antiseptics.

It seems, therefore, that we are wrong to say that there is no cause for pathologic reflexes. Again, every child is a law unto itself. In some there is a thickened fibrous tissue, and it is difficult to erupt through; when the bone is heavy and the child well developed, thick-jawed, the difficulties of dentition are great.

Dr. M. H. Fletcher, Cincinnati: My explanation is in the mechanics of the condition. Take, for instance, an erupting tooth and note how very sharp the lower edge is. When a tooth is erupting and these symptoms are present, I do not think there can be a case on record that would not be found to have bone already absorbed above it. When the child bites its fingers it presses this sharp edge down on the most tender of tissues. Suppose a child in whom the natural processes of life do not go on readily and in whom absorption of the tooth is not what it should be, and there is a hard, dense tissue which does not prevent hydraulic pressure from below, the tooth must expand in some

direction. If it cannot come up it will go down into the tissues below, which are most delicate. This mechanical explanation might be cited as the real cause of the troubles that come in dentition. They may produce all the systemic symptoms spoken of. This seems to me so reasonable that it is surprising it has not been advocated before. On relief of the tissues above this sharp-edged tooth there is relief of pressure and consequent relief of symptoms.

Dr. M. L. Rhein, New York: The consensus of medical opinion has again turned toward the unquestioned state of affairs. The possibility of dentition being a predisposing cause to almost every pathologic condition is, to some extent, a splendid testimonial to the effect of stomatologic instruction to medical men, because it was very difficult a few years ago to get such a unanimity of opinion on this one point.

The great point of classification at the outset should be to separate the different sets of teeth, deciduous from permanent, because there is a great difference in the manner in which the deciduous and the permanent sets are erupted. I differ somewhat with the essayist's classification and consider the special dental classification as to crown and root preferable. The root, more especially in permanent teeth, is very little formed at the time of eruption, and the possibility of that being the exciting cause of irritation is very remote; on the other hand, I favor the mechanical explanation in such a case as outlined by Dr. Latham. The pressure of dentition as described by Dr. Fletcher can readily throw the force of irritation back into the jaw, and thus bring about the deceptive idea that the point of irritation is at the root of the tooth, when there is no real end to the root.

Concerning lancing, the profession of medicine went to the other extreme against the practice years ago. That is because lancing the gum, although it may be a point of great irritation, is generally recognized as a great mistake, for it takes but a few hours for the wound to heal and there is harder tissue for the tooth to penetrate than it had before. After a study of the clinical history of what has been done on this subject, I do not believe there is much doubt but that this is the real reason. Hundreds of cases can be cited to prove these statements. Given a certain case in which there is no question that there is an irritative force which is doing great harm, the removal of that cause is undoubtedly called for,

but the simple lancing of the gum tissue when there is a considerable distance between crown and tissue is useless. Part of that tissue must be removed in order to produce proper results. When that is resorted to no such failure in result is ever apparent.

Dr. George V. I. Brown, Milwaukee: I wish to emphasize the position taken by Dr. Latham. I recall a case in which it was necessary to remove a large sequestrum from the superior maxilla. The patient had also lost a large portion of the tongue, evidently due to ulcerative stomatitis. This case was diagnosed by various physicians as typhoid fever and various other fevers. Finally, one came to the conclusion that the patient had been salivated by mercury given by some other physician. There was nothing the matter with the child except that at some period during the eruption of this tooth there had been a reduced resistance to these bacteria, whereby the bacteria were able to do such disastrous work. The fact that this was a general infection was made clear, because these sequestra included partly developed permanent teeth and deciduous teeth, showing that it was not a progressive condition, as under ordinary circumstances, but one which was taken directly and at once. The clinical summary is borne out by the fact that the first symptoms were chill and fever, the regular symptoms of infection.

There have been other cases with much the same result and much the same history. As these deform the face of the individual through complete loss of both sets of teeth in the regions affected, it seems important to diagnose early. The patient referred to showed a blood count of almost normal, hemoglobin over 80 per cent., showing only a transitory condition. She left the hospital the next day, apparently well. So far as this subject is concerned, it seems a wonder there is so much discussion about the results of reflex irritation from dentition, because it is equally ridiculous to assume that the various disorders of childhood, from the simpler ones to spasmodic affections, chorea, epilepsy, etc., are the result of dentition. Individuals are born with these tendencies, and in some individuals slight peripheral irritation brings serious results. The subject balances itself so nicely that it is not necessary to take a radical position.

Dr. M. I. Schamberg, Philadelphia: The essayist was justified in presenting a phase all physicians should consider. They should

not jump at conclusions. Inasmuch as dentition may become a pathologic process, it must be kept in mind that many of the phenomena spoken of may result in consequence of dentition. Dr. Latham's point was well taken. Dentition may frequently become pathologic. We may liken the birth of a tooth to pregnancy. It is considered physiologic and at the same time is accompanied by many symptoms, such as nausea, vomiting, etc., and at the time of the birth of a tooth there is a similar condition of affairs to that taking place in labor, an aggravated condition, and frequently it may go on to a disturbance of considerable magnitude. More careful observation by physicians for the cause of the disturbance in childhood is needed, and as soon as there is any question the case should be transferred to the stomatologist for his advice. The specialist in these instances is better able to judge whether the gums need lancing or not. The gums are often lanced by the physician unnecessarily, and when they are lanced they are often not lanced properly. With Dr. Latham, I believe there is a pathologic process which can be found by microscopic observation, hence pathologic symptoms.

BETTER SOCIETY ORGANIZATION.

A Wider Field of Work for State Societies. Report of the Reorganization of the Illinois State Society, as a Result of Which Twelve Hundred New Members Have Joined. Suggestions for Other States.*

BY ARTHUR D. BLACK, SECRETARY ILLINOIS STATE DENTAL SOCIETY.

The principal function of every state dental society should be the betterment of the dental service rendered to the people of the state. The number of members in such a society is therefore of great importance. A state society, composed of, say, three hundred members out of ten times that number of practitioners within the state, may be a very good dental society and be very beneficial to its members without wielding much influence for the general good of the people. It is of little service to the patients of the other twenty-seven hundred dentists who

*Copies of the Constitution and By-Laws of the Illinois State Dental Society and one of its Component Societies, also several of the circular letters, printed forms, etc., used by the Reorganization Committee, will be furnished to officials or members of other societies on receipt of request addressed to Dr. Arthur D. Black, 31 Washington St., Chicago.

are not members and have no knowledge of the work of the society. The opportunity for dissemination of new thought is so meagre that there cannot be much progress of the profession as a whole, as a result of the work of such an organization. On the other hand a state society, with fifty or sixty per cent of the practitioners, becomes a representative organization, and opportunity is offered for widespread and thorough distribution of knowledge and for united effort on matters of importance to the profession and public. It is possible that the larger organization may not in the beginning be quite as scientific on account of the large percentage of men who are new in society work, however, I think no one will question the proposition that the general development of the profession of the state will be greater than with the small society.

When a society increases its membership four or five fold, it is very important that the character and ethical standing of the new members have careful consideration in order that the high standard of the organization may be upheld. In Illinois we have safeguarded the future of our society quite fully, as we believe, by placing the selection and election of members in the hands of the men of the particular section of the state in which the applicant lives. Under the new plan it is much more difficult for the unethical practitioner to get in than by the method previously in vogue in our state, by which applicants were voted upon by the society as a whole or by a board of censors. In fact, there are practitioners in our state who were accepted without question as members of our State Society a few years ago, but were refused membership in the reorganized. body. We therefore feel that we have not only made our society five times as large, but have adopted a plan by which we are more certain of the standing and quality of our members than we were before.

THE PLAN OF REORGANIZATION.

The plan on which the Illinois Society has been reorganized is a modification in some details only of the plan on which many state medical societies have been reorganized under the guidance of the American Medical Association. It might be called the "lodge" system of organization, there being a number of local or component societies, which represent "subordinate chapters" and these altogether constitute the State Society or

"supreme lodge." It has been the plan of the medical societies to organize a society in each county of a state and all the members of all of the county societies constitute the membership of the state society. In our dental organization we have in many cases combined several counties in one local society.

The most important feature of the plan is to have the state society composed of a number of component societies, each of which shall have jurisdiction over a certain territory; all members of each local society must be members of the state organization; the dues paid to the local society cover both the local and the state so that one cannot be a member of one and not of the other. Each local society represents the state society in its territory; it passes on all applications for membership from men within its jurisdiction and it may expel members. The territory of each component society is small enough so that the practitioners are tolerably well known to each other and the members of the local society are better qualified to pass on applicants from their section than a committee of the state society could be. The local societies in Illinois have made some mistakes in the election of members, but they have not hesitated to expel men who violated the code of ethics after becoming members.

The component society is the unit of strength in the organization plan. Each component society has for its members men who are practicing in the same section of the state, under similar conditions, and the problems of both a scientific and a business nature are more or less alike for all. These men are soon united by bonds of good-fellowship and quickly realize that by working together they can accomplish many things that were impossible before. They act as a unit for all things which will better the dental service in their respective sections. The public is not slow to realize the fact that the dentists, as true professional men, are working together for the good of the community and dentistry stands higher in the public estimation. The changes that have been brought about in some sections of Illinois during the past two years are almost beyond belief. I quote the following from the address of President S. F. Duncan at our 1906 meeting: "It has resulted in great interest being aroused in localities where formerly there was no interest and

where every man's hand was against that of every other man. And in places where ethics were unknown, good-fellowship now prevails and our men are working hand in hand for the betterment of local conditions and for the advancement of the interests of the profession."

PRELIMINARY WORK.

A considerable amount of preliminary work should be done before definite plans are laid for the reorganization of any state society. First of all, the existing conditions should have careful study. A list of all of the dentists of the state should be prepared; those men who have identified themselves with society work should be indicated, and all undesirable men should be marked. The preparation and checking of this list is no small task. We took a dental directory as a basis and made up lists of the dentists of each county in the state. We then secured through an advertising agency, copies of a majority of the newspapers published in the state and these were looked over carefully and each dentist's advertisement was cut out and pasted on a card, with the name of the paper and date of issue. By looking over these clippings, we were able to check off about two hundred men as undesirable for membership. We also secured lists of the members of the State Society and the various district and local societies, and marked after each man's name the society or societies to which he belonged. These county lists were then sent to men whom we knew in the various counties with the request that they correct them and mark any undesirable men. There were a number of counties in which we knew no one to whom the list could be sent, and it was necessary to get suggestions from known men in neighboring counties. In this way we gradually secured corrected lists for the entire state. In Chicago the lists were arranged by street addresses, thus grouping the men of each neighborhood. The city was divided into sections and each sectional list was checked by men in that section, the same as had been done with the county lists. This required a great amount of correspondence and took considerable time, but it gave us a good basis for future operations. We then prepared a map of the state and marked on each county the number of dentists, the number who were eligible to membership

in the State Society, the number who were then members of the State Society and the number who were then members of a district or local society. This gave a very fair view of the situation with which we had to deal. In several counties we found good local societies composed of most of the ethical practitioners, while in many there was no record of any dentist having ever been a member of a dental organization. This map clearly showed that it would be impossible for us to organize local societies in each county in the state, as a number of the counties had but three or four practitioners. The map was then carefully studied, the transportation facilities and the number of dentists in each county being considered, and the state was divided into thirty-three sections for the formation of local societies. Illinois has one hundred and two counties; these sections varied in size from one to ten counties, and the number of dentists in the sections varied from fifteen to eighty-five (exclusive of Chicago).

During the time that the lists were being corrected, a careful revision of the constitution and by-laws of the State Society had been made, and a constitution and by-laws for local societies had been prepared and printed with blanks for the name of each society, the time of meetings, amount of dues, and other items to be decided by each society, so that it was a simple matter for a local society to adopt the constitution and they were alike for all of them.

This constitution for local societies was accompanied by a printed slip of suggestions regarding the adoption of certain sections. It was suggested that the name selected by each should indicate the location of the society, that it should take the name of the county if it were a single county organization, or the name of the principal or central county if several counties were joined.

The share of dues to be paid to the State Society for each member had been fixed at two dollars; each local society was therefore at liberty to make its dues as much greater than two dollars as it desired, retaining the difference for its own expenses. Most of our societies fixed the dues at three dollars per member, one dollar for the local treasury and two dollars for the State Society; several placed the amount at four dollars and

a few at five. All local societies were requested to make the dues payable as close to January 1st as possible so that the dues would cover the calendar year and be payable in all societies at practically the same time. This greatly simplifies the work of the secretary of the State Society and enables him to assist the local secretaries in the collection of dues by sending out letters to all who are delinquent, at a uniform time.

It was also suggested that in deciding upon the dates for meetings the transportation facilities for the members of the section be carefully considered, and in cases where it required much time or expense for the members to get together, meetings should not be held oftener than from two to four times a year. In those sections in which most of the members could attend without inconvenience, more frequent meetings should be held. The meetings of our various component societies vary in frequency from once a month to twice a year.

WORK OF ORGANIZATION.

There were two methods of procedure in the organization of local societies as components of the State Society. In those sections in which local societies were already in existence they were requested to adopt the constitution we had prepared and to take in whatever additional territory had been included in their section. Most of these societies had been "city" societies and by the change they became "county" organizations. In every case these societies complied with the request of the reorganization committee.

In sections in which there was no society, and this was the condition of most sections, we followed a definite routine. We first selected a chairman for the section and appointed assistants chosen by him. In some cases these committeemen were appointed before the lists were corrected and they were asked to check over the lists. A personally addressed circular letter was then sent to each eligible man in the section, explaining the plan briefly and asking him if he would endeavor to attend a meeting for the organization of a society in his section. A printed circular was enclosed with the letter, also a map of the state showing the various sections, and this particular section was painted red with water-color paint, also a postal card for a reply. A second short personally addressed circular letter was sent

to all who did not reply within a week or ten days and in some sections a third letter was sent a little later. We generally received as many postals in reply to the second letter as the first.

We then furnished the chairman of the local committee with a set of blanks to use in calling the meeting for organization and in many sections we also wrote each eligible man urging him to be there. In sections where there were few men who were then society members, we sent some experienced man to the meeting to explain the plan and assist in the details of organizing. The chairman of the local committee, or the representative of the State Society who attended the meeting, was furnished with copies of constitutions prepared for local societies and a report of the progress of the work of reorganization in other sections to be read at the meeting. This was usually accompanied by a large map of the state with those sections that had organized colored red. This map was of material assistance in appealing to the local pride of men to do what the men of neighboring sections had done.

The chairman of each section was furnished with a typewritten blank on which to make a report of the meeting of organization, a list of the officers elected and the names of the members. On the return of this list a letter was immediately sent to all eligible men in the section who were not present, urging them to join.

The president and secretary of each local society were required to sign an application for a charter and state that their society had adopted the constitution and code of ethics prescribed by the State Society. We then furnished the secretary with a charter, also blank applications for membership, receipt blanks for dues, and constitutions, specially printed for each society; also blanks to use in forwarding dues to the secretary of the State Society.

As soon as the work of organization was well under way, we began the publication of a monthly bulletin which was mailed to all members under second-class postage. This bulletin varied in size from four to thirty-two pages, and was devoted to reports of the progress of the work, announcements of meetings of the various societies, with occasional articles of interest from the

organization standpoint. This bulletin has since been reduced to four pages as the regular number, thus reducing the expense to the minimum. It has undoubtedly been a great help in keeping every one posted and in giving the members of each local society an opportunity to know what the others were doing.

The attention of those who contemplate taking up this work in other states is called to the fact that there is considerable detail connected with the work of organizing a single local society; and that when this is multiplied by twenty-five or thirty, with each section in a different stage of progress, the task of directing the work becomes enormous. Caution should therefore be exercised not to begin work in too many sections at once. There is, however, a considerable advantage in pushing the organization of the various sections as rapidly as possible; in keeping things hot. In each particular section, there should be no delay from the time the first letter is mailed until the organization is completed. In one section in Illinois nine letters were sent from various committees and dental supply houses to each of sixty-four men practicing in the section, asking them to be present at the meeting of organization. The dental supply houses and their traveling men have assisted us very materially in urging men to attend the meetings and in telling those who did not attend what they missed.

A record of the progress of the work in each section may be kept on a card or sheet of paper. This should have the name of the society at the top, then the names of the committeemen for the section and a memorandum of each letter sent to the men in that section and of everything sent to the committee chairman or secretary of the society, such as blanks, constitutions, etc.

We used the highest type of circular letters for most of the recruiting work. In every case the name and address of each man was "set in" on a typewriter in color to match the printed letter, the letters were personally signed and mailed under two-cent stamps. It is our opinion that cheap circular letters, mailed under one-cent stamps, would have attracted little attention.

No state society should decide upon this plan of reorganization without considering carefully the cost. It is not necessary however that a society should have a very large amount of cash on hand to take up the work, as a portion of a state may be

organized and a part of the dues received used for further work. In Illinois the entire state was reorganized within a single year and the Reorganization Committee spent $1,703.71. Of this amount $729.99 was for printing, the principal items of which were: Two hundred and ten dollars and fifty cents for stationery, maps, circulars, circular letters; $208.11 for membership cards, lithographed membership certificates and charters; $261 for blanks and constitutions furnished to local societies. One hundred and eighty-eight dollars and sixty cents was spent for postage, $237.23 for stenographer, $213.35 for traveling expenses of men who attended meetings of organization, and $283.77 for five issues of the Monthly Bulletin. The other expenses of the society were not materially different from previous years.

The largest amount of dues collected by our society in any year previous to the reorganization was $1,245 at $5 per member, while the dues for 1905 (first year of new plan) amounted to $2,522, at $2 per member. It will be noticed that while $1,700 was expended by the Reorganization Committee, the dues for the year were nearly $1,400 in excess of any previous year, and in addition to this a considerable amount of back dues was collected from men who had practically dropped out of the society and were again interested. The dues paid for 1906 up to December 1st, amounted to $2,666. The expenses of the society for 1906 were about equal to its income, owing to the fact that considerable was done by the Reorganization Committee in continuation of the work of the previous year; this consisted chiefly of assistance rendered to local societies in obtaining new members, in the collection of dues, expenses of men to attend meetings, the publication of the Monthly Bulletin, etc. Practically all of our local societies are now well established and running smoothly, and should each year need less and less assistance. Our expenses for the coming year will be considerably less than the past two years; we believe, therefore, that the plan is working well from the financial standpoint.

MAINTENANCE OF A SOCIETY WITH 1,500 MEMBERS.

We cannot state at this time how we are going to succeed in maintaining the large membership we now have. Our membership for 1906 shows a net increase of about one hundred over 1905. The outlook for 1907 is good and we have every reason

to hope for an increase over 1906. We have made membership in the society a cash proposition, and no member is counted for any year until his dues are paid, neither is any Illinois dentist admitted at a State Society meeting or clinic unless he is a member in good standing. It is of course necessary that we do more than keep up our number of members, to make the scheme a success. The aim of the society is to improve the dental service in this state and no stone is being left unturned that will aid in doing this. The value of the work that this society is doing is not to be estimated by its number of members, nor by the interest taken in the meetings and work of the State Society as such. Those who are interested in the true work of advancement that is going on in Illinois, should attend a few of the meetings of our local societies. There is where our men are being developed; there is where they are getting together and doing what each can to help the others. It has been estimated that the total attendance at all of the meetings of our local societies from May, 1905, to May, 1906, was about three thousand, which is of itself good evidence of the interest in the work of the local societies.

The State Society has undertaken to do certain things for its members individually and certain things to assist each local society. It has a contract with the Dental Review by which that journal publishes all of the papers and discussions of the State Society and the Chicago-Odontographic Society, and selected papers read before other local societies; the Review is sent to every member the year round and the State Society pays the bill. The society also publishes a small Monthly Bulletin, which contains official notice and reports of meetings; this is also sent to members free. Each member receives a lithographed membership certificate for each year, also a membership card, which entitles him to register at the meeting of the State Society.

For the local society, the State Society pays the traveling expenses of one man each year, selected by the local society to attend one of their meetings and read a paper. This has proven a very valuable aid in the conduct of many local societies. Local societies are also materially assisted in the collection of dues, and are furnished with most of their printed matter,

such as application blanks, constitutions, statement and receipt books for dues, etc.

Our large membership is a great factor in the society's influence in all matters which a state society should undertake for the public good or the good of the profession. We had little difficulty in securing the passage of a new dental law within a few months after our reorganization, and we are expecting each local society to report violations of the law in its territory and thus rid Illinois of all illegal practitioners within a short time. We have a large and effective organization composed of smooth working components built up on the foundation of good fellowship and we are rapidly realizing the fact that when good fellowship is established between the dentists of a section, there is little difficulty of carrying out any plan of advancement. We are eliminating the "knocker" from the dental profession of Illinois.

We are so thoroughly enthusiastic over the progress we have made that we are anxious to do what we can to assist other states to effect better and larger organizations. Several other states have already adopted similar plans and we have received letters of inquiry from many others. This article has been written with the idea that it may be of some assistance to officials of other state societies and also serve to acquaint the profession generally with the work we have done in Illinois and make each man anxious to do his share in his own state.

When a goodly number of states have so organized there are great possibilities for a national dental organization.

ORAL HYGIENE AND APPENDICITIS.—Some cases of appendicitis no doubt result from infection from unhygienic conditions of the mouth. The writer has seen one appendix which contained an amalgam filling, several bird-shot and several bits of calcic material apparently broken loose from around the teeth and swallowed.—BURTON LEE THORPE, *Medical Brief.*

MALOCCLUSION; WHY CORRECT EARLY?—There are many reasons why a treatment should be started early. Among others, the cartilaginous condition of the alveolar process causes it to yield readily to pressure; the sockets of the teeth are very large and often there is no septum of bone between the alveoli. There is little or no pain if the case is properly handled at an early age. The patient will not be so sensitive about the looks of appliances, nor will retainers have to be worn so long.—T. J. BRADFORD, *Dental Summary.*

Digests.

CONCERNING THE PORCELAIN INLAY. By J. F. F. Waltz, D.D.S., Decatur, Ill. A stage has been reached in the development of the porcelain inlay where the place it shall take among present filling materials is believed to be far more supplementary than supplanting or universally applicable. Instead of the indiscriminate employment of porcelain the pioneer workers prophesied, we now consider its use should be confined, as a rule, to those cavities where for esthetic reasons gold is impossible. The porcelain inlay has gained in spite of extravagant claims rather than through them.

Experience has proved to most practitioners that the use of the porcelain inlay is without any advantages, if not entirely contraindicated, in positions where heavy masticating strain is to be borne. This at once excludes its insertion in molar cavities, except they be buccal or occasionally mesial. The bicuspid proximo-occlusal, and especially mesio-occlusal cavity, if filled with gold would often result in glaring disfigurement; in such cases porcelain is the best filling agent, but should be used with an explanation to the patient that its permanency is more a matter of doubt than would be the case with gold, the improvement in appearance, however, warranting the slight risk undertaken. Buccal cavities in bicuspids unquestionably are best filled with porcelain. All classes of cavities in the six anterior teeth constitute the field in which porcelain finds its greatest application. This last statement brings to mind great proximo-incisal restorations upon incisors, the restoration of the incisal one-third or two-thirds of incisors broken away through accident or unusual decay, cervical cavities troublesome to fill with gold because of the difficulty attendant upon successful application of the rubber dam, and those perplexing conditions which result from extended abrasion and sometimes call for the wholesale building up of both the upper and lower anterior teeth. In short, we may consider the porcelain inlay limitless in application in cavities of these teeth excepting those so exceedingly small and inconspicuous that needless sacrifice of sound tooth substance would be necessary. Tiny inlays are very difficult to fuse and carry successfully to the cavity and may be considered impracticable. Another exception is that of the occasional case where the force of mastication

is so excessive that even gold would be flattened or would give evidence of rapid wear. Porcelain has no place whatever in occlusal molar cavities when there is an antagonizing tooth, for its friability invariably results in a progessive chipping away of the marginal edges, resulting in a crevice and a ditch that plainly rules its use out of such positions. Esthetic requirements, though not often a consideration in these cases, must be ignored.

The inlay has brought its individual set of problems. Some of these have been solved and the procedure involved has been systematized or standardized. Others await a satisfactory solution.

Cavity preparation for the inlay was a bugaboo for a time, owing more to lack of knowledge regarding the materials used than to any fault inherent in the inlay principle of filling. The fallacious idea at first prevalent that a saucer-shaped cavity or one simply ground out with a stone would retain an inlay when

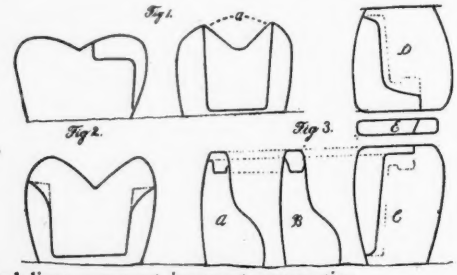


Fig. 2. Dotted lines represent incorrect preparation.

Fig. 3. "A" shows incorrect preparation of incisal seat, while "B" shows proper preparation, allowing maximum bulk of porcelain to protect the enamel. "C" and "D" are labial and lingual views respectively, the dotted line representing the pulpal wall. "E," the incisal edge, showing diagonal course of margin.

cemented did much injury to the work through the loss of fillings made for such cavities. That fillings depending solely upon cement for retention in most cases will be lost was early demonstrated and the resulting study of cavity preparation has brought the matter of retention to the inlay to a position where the percentage of them lost as compared with gold fillings is probably the same or only a little more than the gold filling. This seems a sweeping statement, but the experience of inlay workers bears it out, and of hundreds of inlays made during the past three years, I have had reported only three inlays lost from their cavities. These three were made

within the first month of that time and before I possessed a proper appreciation of the requirements of inlay cavity preparation.

In general, the cavity should have its pulpal wall as nearly at right angles to its lateral walls as can be and all cervical or buccal cavities may be made to conform to these requirements most perfectly. In these cases the depth of the cavity should be such that a considerable thickness of porcelain may be secured. In the inlay method the cavity margins, being made so the filling is fitted to them instead of being malleted against them, must be given the utmost care. All bevel should be avoided and the marginal edge should be made so that none of the enamel rods are cut across, but are all left standing upon firm dentin. The cavity marginal edge resulting is thus like the edge of a perfect cube. The inlay, when made, has a similar marginal edge and when fitted in the cavity makes the strongest adjustment of inlay margin to cavity margin. That this adaptation may be absolute the cavity margin must be carefully chiseled first, then made smooth with stones as corundum, or better the "gem" points used with water, and finally polished with Arkansas stones and fine cuttlefish disks. This, to be done thoroughly, requires frequent examining with a fairly strong lens, thus bringing to view many roughnesses that had previously seemed perfectly polished surfaces. Such treatment of marginal edges applies to all inlay cavities and too much care cannot be put upon their preparation.

In proximo-occlusal cavities in molars or bicuspids the general shape of the cavity can be made the same as that for a gold filling, avoiding all undercuts through the use of round burs. The cavity may be freely outlined in conformity with extension for prevention doctrine, and in this class of cavities the proximo-lingual and proximo-buccal cusps must be ground with small carborundum stones so that any frail enamel in these regions may be completely covered with porcelain. Fig. 1. This avoids as well the frail edges of porcelain at A and greatly lessens the danger of fracture of the inlay. Those portions of the lingual and buccal margins at right angles to the long dimension of the tooth should be prepared so as to admit of the greatest possible bulk of porcelain being built over them. Fig. 2.

In simple proximal cavities in the anterior teeth the preparation whenever possible should be such that the filling may be introduced

from the lingual. This leaves a strong wall to oppose the prevailing stress acting toward dislodgment, and has the esthetic advantage of bringing a minimum of filling into view. The lateral walls must be as nearly at right angles to the pulpal wall as possible and the cavity made to approximate the shape of a box as closely as conditions will permit.

Proximo-incisal cavities should be given a flat base or one somewhat inverted—V-shaped—which allows the filling to be most securely seated or locked into place when the force applied against the incisal edge is the greatest. Many times teeth presenting these cavities are pulpless and this makes it possible to carry a heavy bulk of porcelain into the former pulp chamber. The incisal portion of the pulpal wall should be grooved, at least slightly, to offset forces acting at right angles to the long axis of the tooth which tend to dislodge the inlay. Often in vital teeth the restoration to be made is so great as to require the filling to be carried over the incisal edge as is necessary with large gold fillings. In these cases the labial plate should be shortened and covered with a sufficiently strong thickness of porcelain made as heavy as possible by preparing the enamel plate as in figure 3. The lingual plate may be cut away as extensively as required to secure adequate anchorage.

Cavities made for restorations of abraded surfaces are as simple as the cervical cavities, and their forms will be governed so largely by particular conditions that a description need hardly be attempted. One feature to which I am strongly opposed, however, is the employment of a pin or post fused into the inlay. Such practice is never necessary, and makes for weakness in the filling more than it compensates for in strength of retention. Cavities may be prepared in most instances so that the prevailing stress acts to drive their fillings more securely into the cavity, and when tried in place before cementation the fillings may not be rocked or moved in the least. Such preparation clearly places the smallest amount of strain upon the cement and gains the greatest amount of retention in the cavity form—a state of affairs the inlay worker should always strive to attain to the fullest extent.

The making of the matrix brings up for consideration the grade of porcelain to be used—high or low fusing. Certainly that grade with which the individual secures the best results is the one to use, but from my own observation and personal experience I have come

to the conclusion that equally as artistic results are possible with the Jenkins' porcelain alone as with any other, and in most hands these results are more readily obtainable. Early in my practice I firmly believed in high fusing materials and methods, and considered high-grade work could result only from the employment of such methods. Consequently when I spent a year with Dr. Jenkins in Dresden and observed scores of inlays which had done service eight to ten years and even longer, I was amazed and soon revised my porcelain creed. What I saw there convinced me beyond a doubt that Jenkins' materials secure unexcelled results, and observation and experience to the present time have confirmed and accentuated this belief. What the Jenkins' material may lack in exact matching of the shades of the natural teeth is made up by the ease with which it is built up and fused and the entire absence of any tendency to form bubbles in the process. Further, a gold matrix may be used, and this in itself is so great a boon as to bring Jenkins' materials into wider use. I must state I have not worked the Brewster gold matrix porcelains, but have observed excellent inlays made of them. The assertion is made by authorities that platinum possesses superiority over gold as a matrix material and that it may be fitted in any cavity as easily and rapidly as gold. After considerable experience with both metals such a statement seems ridiculous, and is proved so when a devotee of the platinum matrix gives a clinic on this subject. He commonly employs parts of several sets of instruments especially devised for the purpose, anneals, and re-anneals, and then perhaps after the first baking carries the matrix to the cavity for readjustment. To fit a gold matrix is very simple and requires no special instrument unless it be the ball-pointed inlay pliers. Using these, a square of No. 30 gold foil sufficiently large is taken and with very small bits of moistened spunk carried to the bottom of the cavity, then with additional spunk and pressure fitted accurately to the floor; care must be taken not to outline the margins before this has been accomplished. Any folds should be smoothed out as completely as possible, though if some minor folds are left, they may be burnished to the average thickness of the matrix. Then the gold should be carried over the margins with spunk—no general burnishing of the gold with instruments should be done or an objectionable springy temper will be developed. When this stage is reached the

matrix may be withdrawn and such bits of the gold cut away as seem likely to interfere with its final removal from the cavity. However, as much gold as possible should be left to reproduce the tooth form for a guide in building any needed contour. Carefully replaced in the cavity the matrix is packed with gum camphor (the Japanese camphor seems best for this purpose) until flush with the margins. Then with round pointed burnishers the camphor is drawn down over the margins until they are accurately and clearly shown in the gold. An explorer is forced well into the camphor and the matrix clinging tightly to it is thus removed from the cavity and carried to the laboratory to be invested with an asbestos and water mixture in a fusing tray or pan. This is done quickly and easily; the water is slowly evaporated from the investment, then the camphor is burned away, leaving revealed a matrix which represents a perfect impression of the cavity and one which cannot change form during the process of fusing. The feeling of security the investment lends the work is a positive pleasure; no thought need be given to any effect shrinkage of the porcelain may have on the matrix; the investment provides against this and the camphor has made it certain no distortion can have occurred as the matrix was carried from the cavity to the investment. Any tears in the matrix are immaterial provided the margins are not involved —the porcelain will flow and fuse perfectly over them unless the openings are very large, in which case a small pellet of gold may be patched over the aperture made by the tear.

Inlay work requires much separation—one feature of the work which is a *sine qua non.* For this purpose I believe immediate separation should invariably be used and this may best be accomplished with the Perry separators. The general form will answer in the great majority of instances, though occasionally individual forms of that separator adjust more suitably. Base plate guttapercha packed between the teeth and the separator bows prevents slipping of the beaks rootwise into the gum and also renders the separator firm and steady. The separator is adjusted previous to the cavity preparation and kept in place until the inlay has been set. This method does away with special visits to the office for separation, thus saving the patient the misery of sore teeth for several days, and is generally so much better as to make any other method seem a departure from good practice.

When the saliva is kept from contact with the teeth the tooth color soon is observed to have become much lighter. This requires the exact determination of the tooth shade to be made at the very beginning of the operation. At this point one is confronted with a consideration of the most perplexing feature connected with porcelain inlay work—the shadow problem due to the opacity of the cements. Were it not for this, or if we possessed a translucent cementing agent, invisible fillings would be made easily, whereas now an inconspicuous filling is all one would better promise a patient. The situation is briefly this: Imagine the distal surface of a right upper central incisor filled with porcelain and the patient standing so that the main source of light is from the left. Now, inasmuch as the tooth transmits light after the manner of opalescent glass the rays of light penetrate to the retaining film of cement; this being absolutely opaque checks all direct rays at least, and consequently the filling is in a shadow. In case the porcelain had the exact color of the tooth the effect in this instance would be to make the cavity appear not filled. To appreciate the effect of this shadow on the appearance of the filling requires some experience. Subsequently the selection of the proper shade for an inlay should be made with this effect in mind. In general all distal fillings should be lighter than the tooth color in order to neutralize the darkening shadow cast by the cement. In case the cavity is large and the filling in being brought over the labial surface to the median line receives some direct rays of light, the shadow is not so intense and the color must be nearer that of the tooth. All mesial fillings, if prominent, must be slightly darker than the tooth. This is true also of labial fillings. The movement of the lips upward and downward in front of the teeth as a curtain and the drawing of the corners of the mouth backward in speaking, smiling and laughing, constantly vary the intensity and directness of the angle of the light rays entering the filling, and thus often make a very perplexing question of the shadows cast by the cement. Restorations involving the incisal edge, if of any considerable width mesio-distally, are usually extremely satisfactory in appearance, for in any position some light rays enter the porcelain at so nearly a right angle that the true color is constantly seen. Anterior cervical or labial fillings are often very disappointing. If the direct light thrown on them when the lips are drawn beyond the gingival border reveals a

satisfactory appearance the occasional view given of the filling in speaking will make it plainly visible, though perhaps not conspicuous to the casual observer, and never glaringly so, as would be the case with gold. Experience enables one largely to control this feature, though there are positions where the restrictions placed upon the work by this problem make one fervently hope a translucent cement or other solution may be near at hand. A shade guide is best used merely to indicate or suggest the shade of the tooth, the operator then making that selection of porcelain bodies in the laboratory which his eye conceives will make proper harmony with the tooth. This is not a task for the ultra-skillful alone, only accomplished after a tedious study of layers and combinations of colors, but rather a process any capable, careful dentist can carry out. Usually the shade desired is gained only by combining two or three shades, the resultant being a blend that approximates the tooth color better than will any one shade used from matrix to the final fuse.

The fusing of the Jenkins' and other low-fusing porcelains must be done carefully in order not to over-fuse and burn out the colors. The temperature required is so much lower than the glaring white heat needed for the high-fusing materials that the exact degree of heat can be seen more easily. Thus the greater liability of the colors burning light is a disadvantage that is lessened by the ease with which one may judge the degree of heat being applied. Jenkins' body shrinks greatly in the first bakings, which should be carried only to the biscuit stage. This shrinkage often is considered an objectionable feature, but by this property of condensing itself into smaller space the porcelain apparently attains that density and homogeneous condition which are so desirable in the finished filling. The body is so quickly and easily built up and made ready for a fuse and then fused that the question arises why shrinkage should be thought any objection whatever. The filling can be finished with four fusings sometimes, but usually one or two more are needed, the highest heat being applied in the last fuse to secure an even gloss, rather than a glaze.

The gas furnace is used most commonly with Jenkins' materials, and has given most satisfactory results because the heat can be regulated so easily that the chances of over-fusing are minimized. This is true of the gasoline furnace as well. Furthermore, the

Jenkins' shades were developed and determined through experiments made almost exclusively with the gas furnace, and hence better results with them are secured in the operator's hands by this means. Before the fusing pan and its matrix and investment are enveloped in or surrounded by heat, it is necessary in order to secure in them an even temperature that the heat should first be applied from below for a few seconds. Otherwise the porcelain body is likely to be overheated in bringing the investment up to the temperature necessary to secure the proper fuse of the porcelain body. The ordinary electric furnace acts in this objectionable manner, radiating heat as rapidly from above as from below, thus often bringing portions of the porcelain to a fusing heat before portions placed deeper in the investment are fused. Dr. Custer has devised an electric furnace in which the heat enters the fusing pan and contents from the bottom and sides and not at all from above, thus making it certain the investment is evenly heated throughout when the porcelain fusing temperature is reached. Recently Dr. Roach, of Chicago, brought out an ingenious electric furnace in which a temperature once secured can be reproduced any number of times, and the claim is made that by its use a color once secured always can be reproduced. Though I have had no personal experience with this furnace, it would seem to promise a better means of fusing the Jenkins' porcelain than has yet been devised. In these days when electrical appliances are accepted as the latest improvement, to use a gas furnace may seem to place one rather back in the ranks, but an appreciation of the special requirements of the invested matrix with its lower fusing body is necessary to replace successfully or advantageously gas with electricity.

The inlay, having been finally fused, is allowed to cool slowly to avoid any brittleness which a sudden cooling might produce, then the matrix is stripped off carefully after being immersed in water. Dr. Head's experiments seem to prove the greatest adhesion is secured when inlay cements are used with the cavity surface of the inlay etched and heavily undercut and the cavity walls roughened. This can be done in such manner as to secure the effect that would obtain were pins with heads fused into the inlay. For this purpose steel wheels charged with diamond, such as are made by Ash & Sons, are preferable to copper wheels similarly charged, because of the very objectionable black debris left upon and in the porce-

lain by the use of the latter. Etching with hydrofluoric acid in my opinion is unnecessary, a very similar surface being secured by carefully removing most of the glaze with the diamond or other wheels. The inlay being ready to be fixed, the surface of the cavity should be roughened and rather undercut in such manner as to secure grooves or pits opposite the grooves of the inlay, thus making the cement bond similar in effect to the key which binds a wheel upon its shaft. The cavity and inlay being washed with alcohol and dried, are ready for cementation. The cement should be mixed carefully and thoroughly and applied and rubbed with an appropriate burnisher over the cavity surface of the inlay, carrying it well into all grooves. The cavity being rubbed with cement the inlay is carried to position and pressed home. For this purpose an orangewood stick should be used, for in case of the glancing or sliding of a metal instrument a marginal edge might be chipped and ruined. Firm though not excessive pressure should be maintained against the filling for several minutes, then the excess cement should be removed and a film of paraffin melted over the filling if Harvard cement has been used. This will keep the saliva away until complete crystallization of the cement has taken place.

At a subsequent sitting uneven margins may be carefully finished first with the wet "gem" stones, then with Arkansas stones and finally polished with cuttlefish disks. A sitting for this purpose may be avoided usually by wedging the filling to place previous to setting and very carefully using the stones or cuttlefish disks; or these may sometimes be used shortly after cementing the filling. The work should be shown the patient in the normal light and with a natural position of the lips as near as can be and with the mirror held two or three feet from the face. The lightened color of the tooth due to its partial isolation from moisture should be pointed out as well as the fact that after some three or four weeks an improvement in appearance will have taken place, owing to the cement film having dissolved a trifle, thus allowing rays of light to penetrate to an increased extent and producing a more lifelike and pleasing effect.

In conclusion, the disappointments of the work may be considered. Foremost under this head are the discouraging effects due to the cement problem, but in the hands of an operator of some experience the worst of these is yet the greatest improvement over any

effect obtainable with gold or gold and platinum. Then, again, an inlay that was especially pleasing when inserted is often seen within a year to be outlined by a line of the dark stain most commonly observed upon the gingival surfaces of a set of teeth perhaps otherwise free from deposits; the line of stain having formed in the crevice left by the slight washing out of the cement. Usually the means employed to remove this stain from the teeth are effective about inlays, but its existence has a regrettable effect upon the appearance of this work. Many times those cases in which it is necessary to carry a margin over the incisal edge return distressingly affected. After a long period of wear, or in cases where erosion has taken place, porcelain inlays are found much higher than the surrounding tooth surface; a condition due to the unequal wearing qualities of the two substances. This condition is seen rarely with gold or amalgam because these materials seem to wear away nearly as rapidly as the tooth substance. Further, it matters not how accurately the work may have been done, the cement line is always distinguishable when passed over with a fine explorer point, and to a gold worker, whose standard of marginal finish requires there should be no perceptible difference to the feel of the explorer, this is disquieting, and a thought of the sealed and moisture-tight character of the inlay joint is needed as assurance that "all is well."

It is unfortunate that there is prevalent such a hesitancy over the adoption of porcelain as a filling agent—a hesitancy in part due to a feeling of uncertainty as to the permanency of porcelain operations, but much more attributable to timidity in undertaking a work that is believed to entail a very different, difficult and intricate technique.—*Dental Review.*

METABOLISM AS A CONNECTING LINK BETWEEN DENTAL SURGERY AND GENERAL MEDICINE. By L. Ashley Faught, D.D.S., Philadelphia, Pa. The current literature of any profession reflects the status of that profession. The researches of the most active minds engaged in the practice of that profession, and the vital questions of the hour attracting their thought and attention, are here recorded. To this record, as to a gauge, one at any stage may turn and learn of the degrees of professional

progress. What dentistry was, what it is, and in a measure what it will become, may therefore thus be definitely traced.

Not to him who reads of the present only, but rather to the thoughtful mind taking a comprehensive review, is the interesting picture of its evolution revealed. Seventy years ago dental surgery proposed to begin as a specialty of general medicine, for the thought presented itself to the few intelligent men then engaged in operations upon the teeth that the care of these organs was worthy of the attention of medicine, and overtures were made by them to the medical faculty to give dentistry consideration. The idea, however, was in advance of the age, and the relationship was not apparent to the medical profession. Today dental surgery does not stand asking this incorporation, but is accepted without specific thought or attention to the fact.

The forces producing this condition are many and various. Two of them perhaps stand out more markedly than the rest, one strictly surgical and the other strictly medical. The orthopedic treatment of the face as embodied in orthodontia is the surgical factor, and the medical factor is to be found in the diseases of metabolism.

It is important to note that dentistry today is not composed of two-thirds manual training and one-third surgical science, but includes the wide medical knowledge so necessary to treat diseases consecutive to disturbances of the teeth, viz., diseases of the gums, of the jaws, of the maxillary sinuses, etc. This necessarily creates a division of technical dentistry, surgical dentistry, and medical dentistry.

In the year 1835 the degree of Doctor of Dental Surgery was deemed proper, because relief from the distress of "decayed" teeth was to be had by extraction, and this removal was surgical in its nature. Further, relief under certain conditions was given by filling the cavity of decay, and this being a mechanical procedure was surgical in its nature. A demand was created by the loss of teeth for their artificial replacement, and the making and insertion of appliances for this purpose seemed to be surgical also. For cosmetic effect an irregular tooth occasionally was drawn into better position, and this too was of the nature of surgical intervention. Dentistry was thus naturally branded "dental surgery," and the literature of the new profession dealt with the daily conditions of its practice—the methods of making artificial dentures, the procedures

involved in extraction, the medicaments for the relief of toothache, the questions of tooth-stoppings, the quality of soft or adhesive gold, amalgams, guttaperchas, cements. No wonder the medical profession saw little of their own methods, either medical or surgical, involved in all this.

Slowly but surely through the years devoted to these things a new era was developing, and as a knowledge of anatomy and physiology was attained, a constant undercurrent of thought was working out something better and higher. In due course of time it came about that a tooth was not filled simply, but it was filled with due consideration of its chemic relationships and with attention to its occlusal and approximal shapes. Artificial teeth were not to be inserted into mouths as simple replacements, but were to restore the functional purposes of teeth. Cosmetic effects were no longer the only motive for the treatment of irregular teeth. The secrets of occlusal relationship were studied and the intentions of nature along full functional lines recognized, and these were met in the treatment given. Dentistry then was truly becoming surgical.

A little farther on, the domains of the rhinologist and the laryngologist were touched and overlapped. Bacteriology was studied, and later, as a fitting outcome of this development, a jump was taken as it were into the future, and dental prophylaxis becomes the watchword of the present hour, not only of the dental surgeon, but also of the general surgeon. Functional restoration in every direction having been obtained, functional activity is to be maintained.

Prevention has its place in dentistry also, and the highest pinnacle would seem to have been reached were it not that, as dentistry has developed, civilization has engrafted a strenuous life upon the people. Systemic disturbances have resulted which have such dental and oral manifestations as to demand the attention of the dentist as well as of the practitioner of general medicine. These are not truly diseases of dental origin requiring general medical treatment, but medical diseases with dental and oral manifestations; diseases which, unseen by the physician, often very far in advance of any knowledge by the patient or of any other notable signs of their presence, sound in the oral cavity a tocsin of warning, recognized by the dentist and demanding treatment at his hands. The practitioner of dental surgery is thus forced over into the domain of general medicine.

The diseases referred to center in and around metabolism. The dentist must comprehend the influence of the trophic nerves and the questions of normal secretion and excretion, the maintenance of a proper balance between waste and repair, the influences of the blood, its composition, and the disturbances of its circulation. Hepatic and renal conditions must be considered. Analyses of saliva and urine must be made and interpreted. At the end of seventy years of such evolutionary progress the medical faculty is welcoming its brothers in the healing art with open arms, and no longer looks askance, for dentistry has demonstrated that it is a specialty of medicine. A peculiar specialty it is, but not strictly surgical, and the day is at hand when the term dental surgeon must give way and be replaced by stomatologists, as indicative of one who treats his cases with the broadest culture. Dental colleges will then have added to the present curriculum by training students in such general medicine as has been outlined.

When this time comes, the propriety of the present attempt to divide dentistry into specialties may be questioned and may call for readjustment, for a specialty of a specialty would be somewhat incongruous! All such division undoubtedly develops technique, but this development of technique has already given evidence of a tendency to produce a narrower field of vision; by which, not infrequently, in the accomplishment of a particular purpose, are deranged the organic functions of the oral cavity.

The technique of crowns, bridges, artificial dentures and appliances of orthodontia must surely continue, for they are necessities, and consequently will continue to segregate artisans to produce them. However, this issue may be left to the control of that same evolutionary force which has already done so much and which undoubtedly will prove abundantly potent to properly regulate the matter.

The diseases of metabolism are at our door, and it is not a theory but an actual condition which confronts us, and bids us to measure up to the occasion.

The study of metabolism is the study of an intricate and important subject. The term indicates the changes occurring when living organisms, by inherent functional power, take substances derived from food into their tissues and make them a part of themselves; an uplifting by which living material vitalizes crude nutri-

tive material, or increases molecular complexity: anabolism. It further has to deal with the removal of broken-down material, which is the result of this nutritional process; a change in the opposite direction, decreasing molecular complexity: catabolism. In two words: assimilation, excretion.

The study of the individual is really the study of the cell, and the assimilative and dissimilative changes taken together are nutrition—metabolism. Food decomposition does not take place in the blood and fluids, but in the tissues, where the decomposition is brought about by the chemical activity of the cells. The destination of food is the growth and renovation of the component parts of the body and the production of heat and energy. For these purposes the actual seat of utilization is within the protoplasmic or biogenic molecules constituting the basis of living matter. It is here that the active changes of life occur. Food elements on the one hand and oxygen on the other enter the large and highly complex molecules of which protoplasm is composed, and through the play of changes ensuing, the phenomena of life are evolved. As an outcome of this proposition, the food material has to reach these protoplasmic molecules, and in so doing traverses the circulatory system. Solid matter has to be brought into a liquid state, and all nutrient principles to be placed in a condition to which the property of diffusibility belongs. This is effected by enzyme action, the enzymes being products of secretion of the digestive system, adjusted by nature to accomplish the purposes required to be fulfilled.

Digestion is the preparation of food for absorption, but ideas regarding what is needed to permit of entry into living protoplasm, and thence of taking part in the metabolic changes occurring, have in recent times undergone great development. Formerly it was considered sufficient to regard digestion as bringing the food into a liquid or diffusible state so as to permit of the occurrence of absorption in compliance with the physical laws of osmosis. The effect of modern research, however, is to show that it is by the instrumentality of cell action instead of by physical osmosis that the products of digestion pass into the system, and absorption may be said to mean bioplasmic incorporation, the absorbed material passing into and becoming a component of living matter. In other words, it is assimilated. The process of digestion not only reduces the size of molecules to give the property of diffusibility, but also

makes them of such construction as to be adapted to unite with those into which they are intended to become incorporated. It is the province of the enzymes to bring about this adaptation, and unless it is brought about there can be no combination. This having been effected, the union takes place by virtue of affinity; the affinity being dependent upon molecular configuration. Under this view of physiologic metabolism, as set forth by Pavy, the food principles are constructed by assimilative action into the principles of the blood. The blood feeds upon the food supplied from without, and the tissues feed upon the blood. Among the recognized components of the blood are the corpuscular elements, and these are now found to be more varied than as set forth by the old division into the red and white corpuscles. It is through these elements that the prepared material is taken to the appropriating tissues. Oxygen is taken in by the hemoglobin, and in a state of combination transported to the tissues, where it is taken off and applied to utilization.

When this physiologic procedure takes place, the organic portions of food, known as nitrogenous and non-nitrogenous, become lost to sight after being ingested; on the other hand, when for any reason this process is disturbed, certain conditions result and pathology steps in to account for the disturbance.

It is necessary, therefore, that the dentist have a clear comprehension of the normal conditions of nutrition, that he may not be led into erroneous interpretations of pathologic conditions; for the knowledge of the one is immediately involved as a basis by which to read correctly the other. He may make local applications again and again without any possibility of curing the case which has come to him for treatment. Nothing but personal mortification and professional stultification can be the result. He can treat successfully only as he is able to pass into the broad domain of pathology, lay his finger upon the disturbing cause, and correct the attendant abnormal condition arising therefrom.

Some of the diseases of the uric acid diathesis, perhaps, may be taken as a fair illustration of the point asserted, and also as illustrative of the loose, disjointed training in general medicine evidenced on the part of many of the dentists who in the last decade have essayed to write on this subject. A review of the many articles written and published in our literature shows a lack of accurate knowledge which has not infrequently led to an unwitting misstatement of fact.

William Henry Porter points out that uric acid is formed normally and solely by a process of oxidation, that it never exists in foodstuffs, and that there is no method known to chemistry by which logically and accurately we can assume that the uric acid exists in the blood. The proteid molecule, in its isomeric transition through the system, often reaches the condition in which it is more easily oxidized into a uric acid molecule than into urea. None can deny, however, that an antecedent is not a finished product.

Accepting this theory of oxidation reduction of a certain isomeric form of the proteid molecule in the renal cells, it is easy to explain the presence of uric acid and the formation of urates, together with the production of the insoluble phosphate of calcium urate deposited at various points of the body outside the renal structures. The disturbance of metabolism that is concomitant with this condition results in certain instances in a vicarious action on the part of the various protoplasmic structures throughout the animal economy. As a natural sequence of this vicarious action and imperfect oxidation reduction, uric acid is produced suddenly and unexpectedly at various points in the body. Following this sudden formation of uric acid, there are produced at these local points urates which are either the insoluble phosphate or calcium urate, or both.

To understand fully this instantaneous formation of the urate and the necessity for the production of uric acid in the renal cells, we must follow the so-called alkaline phosphates in their transit through the system. The normal phosphate of the blood is a neutral salt, and the one in the urine is an acid salt. The presence of the neutral sodium phosphate in the urine tends to hold the uric acid in solution, but at the same time it favors a deposition of the earthy phosphates, and thus has a tendency to excite the formation of phosphatic calculi. Therefore, it is essential to rid the urine of this salt, and to secure in its place one which will hold the earthy phosphates in solution, destroying the irritating properties of a strong solution of uric acid. The uric acid, as it is formed and discharged from the renal cells, comes in contact with the neutral sodium phosphate, which is constantly escaping from the blood into the uriniferous tubules, with the development of a sodium urate and the formation of the sodium acid phosphate in place of the neutral salt.

The practical aspect of the subject is that an over-production of uric acid is always dependent upon three general principles:

(1) A defective oxygen supply.

(2) Taking into the system more food than can be perfectly oxidized.

(3) Disturbances in the action of the nervous mechanism.

The process of oxidation as a potent factor in metabolism must not be overlooked. It is as necessary for us that the carbonic acid produced as a result of the operations of life should be conveyed from the tissues to the lungs for discharge as that oxygen should be conveyed from the lungs to the tissues. The sodium carbonate and phosphate are the agencies mainly affecting the conveyance of carbonic acid to the lungs for its discharge. The appropriation, therefore, through faulty metabolism, of the sodic alkali is of serious import. Faulty metabolism often takes the form of a deficient absorption of fats, and this form is more far-reaching in its effects than is generally recognized. The fats supply the heat or energy which the body demands. Proteids, to be found in all lean meats, cheese, eggs, milk, and vegetables, furnish both energy and tissue-making material. The tendency of the body is to assimilate first heat or energy for the performance of its functions, and it will draw the necessary amount from the proteids if it have not a sufficient supply of fats, with the result that tissue-building is neglected for want of material. It is, therefore, important to know this fact, and it is necessary often to see that fats are supplied that they may act as proteid-sparers.

Everything at the present hour points to the fact that the future of dentistry lies not in the narrowing confines of developing technique, but in the additional important cultivation of broad medical training.

So true is this that the student will have a decided advantage who is fortunate enough to pursue his initial studies of dentistry in institutions connected with medical colleges and hospitals. The atmosphere of medical thought, and the fully-equipped physiological and pathological laboratories, lead to investigative action, and will produce men who are not likely to lay aside study and research with their day of graduation; and undoubtedly the field of metabolism is sufficiently attractive, and it is to be the connecting link between dental surgery and general medicine.

In conclusion, I wish to give credit to the works of Brubaker, Hare, Pavy, Hofmeister, Porter, Hewlett, Weintraud, and Von Noorden, from whom I have freely drawn in the preparation of this paper.—*Dental Cosmos.*

SOFT GOLD FOIL AND CYLINDER FILLING. By Dr. James H. Beebee, Rochester, N. Y. It seems strange that cylinder fillings and the use of so-called soft gold should be looked upon by the average dentist as a matter either beyond his ability or as undesirable on account of supposed uncertainty. This uncertainty absolutely does not exist if due care and judgment are exercised by the operator in first choosing his cavity and secondly its preparation. The inability is easily overcome by anyone who will follow a few simple instructions.

A suitable cavity can be more accurately filled by this process than by any other of gold filling. This is because the leaves of metal moving more easily upon themselves, slide and adjust themselves to the various inequalities with less force than the particles or atoms of the metal can in case of cohesive gold.

Some years ago I made a matrix of two plates of hardened steel held together by two strong screws. Before the hardening a hole was bored into the joint, forming a cavity, one-half of which was in each plate. This cavity I filled with cylinders of soft gold and filed off the surface. I weighed the filling after its removal from the matrix and handed the matrix to Dr. Requa with the request that he fill it with cohesive gold. This plug was also filed even with the surface and weighed. Dr. Requa afterward informed me that he placed it in a vise and used a hammer. My plug weighed 133 while that of Dr. Requa weighed 135 grains. Now this is easily accounted for from the fact that the center of all cylinder fillings is not as dense as at the walls, though the surface may be perfectly condensed.

In forming the cavity for a cylinder there are necessary strong walls that will resist pressure, and which are as nearly parallel as possible, with few undercuts; and smooth walls free from irregularities and angles.

In the preparation of the foil for the filling, use knitting-needles of smooth wire of a size indicated by the depth and size of the cavity. This wire should be in diameter about two-thirds the depth of

the cavity. A pad of buck or chamois skin should be at hand. Use No. 4 foil, preferably corrugated soft. Cut the foil into strips about four to the sheet and roll on the selected wire. If the hands are damp, put a piece of bibulous paper or cloth on the fingers. Roll the foil loosely on the wire and withdraw the wire. Then, with a watchmaker's five-sided broach cross-roll the gold into the cylinder of desired size, and withdraw the broach, at the same time flattening the cylinder between the thumb and finger.

After sufficient gold has been prepared and the cavity dried, place a cylinder in the cavity with its end at the bottom and press gently to place.

At this point most beginners fail; they try to condense too much. The condensation should be slight until two or three cylinders are in place, so that one may wedge the other. After sufficient metal has been introduced, commence condensing by pushing the central cylinder home with a wedge-shaped instrument, gradually forcing it from the center to the outer walls. Introduce other cylinders and repeat the operation. After the walls of the cavity are well covered anneal the cylinders and condense as the filling progresses, care being taken that only soft unannealed cylinders come in contact with the walls. Finish, if necessary, with cohesive gold.

At this stage the plug should have the appearance of a yellow wart, the gold standing well out of the cavity. Now condense the surface. It is here that the parallel walls show necessity. Should there be a soft spot the gold will be driven into the cavity and against the wall rather than away from it. The instruments used in condensing should be the flat burnisher first, then the round one like a blunt needle, and finally the ball, and, if possible, the corrugated engine burnisher. Finish in the usual way, only stop often and use the burnisher assiduously. Should a soft spot be found puncture it with a pointed instrument and insert a small annealed cylinder and proceed as before.

The advantages claimed for this form of procedure by those who practice it, is that there is a far greater certainty of accurately fitting the plug to the wall of the cavity. This is true especially in cavities in approximal surfaces, where there is difficulty in seeing the work during the operation. There is also far less aptitude of pushing off the enamel at the cervix.

It is easy to remove from a tooth that has been excised that part of the enamel that is removed before fitting a band in crowning a tooth. A hook-shaped instrument placed above the enamel will usually remove it easily. This is why so many of our fillings fail at the cervical margin. This thin enamel is pushed off by the blows of the mallet, whether the ordinary hand or the automatic mallet is used.

Some teeth can be saved almost indefinitely by a good filling, and some not at all, but I believe that a much softer structure can be preserved from further decay by this process than by the cohesive filling. In 1896 I saw some fillings in the approximal surfaces of some central incisors that were put there by Dr. L. D. Walters in 1852. They had been there for forty-four years, but I will say the teeth were teeth.

It is not easy to describe the form of instrument to be used. Often any old thing can be utilized. I think I could put an occlusal filling in a molar with a pair of pliers and a wire nail set into a piece of wood. In general, however, instruments of a wedge or cone shape and of various sizes should be used, for as the filling progresses smaller instruments are necessary.

We talk of soft and cohesive foil. Of course, the purer a foil is, the more cohesive it can be made, and few realize that all pure gold is cohesive when its surface is perfectly clean. Non-cohesive or soft gold can be made cohesive by cleaning, which is most easily accomplished by heating to ignition, thereby burning off the impurities. That this can be done is due to the almost absolute non-affinity between gold and oxygen.

One other advantage claimed by the advocates of the cylinder form is its rapidity. It is often easy to put in a fair-sized filling in from five to ten minutes, and unless the patient is informed of the process he may feel that the work is not well done, or that he has been overcharged. However, there is little difficulty of this kind when the patient has been informed.—*Dental Office and Laboratory.*

SOME REASONS FOR SUCCESS OR FAILURE IN THE PRACTICE OF HUMANITARIAN DENTISTRY. By W. G. Ebersole, M.D., D.D.S., Cleveland, O. Why most men fail where others succeed is a question upon which volumes have been writ-

ten. Why almost all men fail while others succeed in the practice of Humanitarian Dentistry, is a question which while confined to one particular field of work, is one that would require many papers at the hands of the men most familiar with the dental profession individually and as a whole, before it could be answered.

Let us understand at the very start that the writer of this paper has been and is one of the most rabid advocates of this so-called Humanitarian Dentistry. It has been the hobby of his professional life, the riding of which has resulted in both good and harm. In this, however, he has not been alone. Others have been valiantly fighting for the same cause, and the combined efforts have resulted in much good and some harm.

The good that has been accomplished is that results have been attained which make it possible to eliminate 95 per cent of the pain formerly thought necessary to insure perfect dental operations. Let us understand this statement fully. It is not meant that 95 per cent of all dental operations may be made free from pain, but that when all pain from whatever source or cause is considered, 95 per cent of it can be eliminated by the employment of methods and means at our command.

Strong statements have been made in the past, and are being made today, and made in all truth and candor. Men have been so filled with the possibility of this work, and have obtained such results that they have been loud, not only in proclaiming the results of their efforts, but have insisted that all could obtain the same results if they would but try. Many have written and spoken thus, forgetting that a possibility to some is an impossibility to others.

Methods have been advocated and results have been proclaimed which to the inexperienced were impossible. Doubt has been created as to the truthfulness of the writers and speakers upon these subjects, resulting in almost the entire profession arraying itself against those advocating this class of work.

The realization has come to me that the main reason why most men have failed in their attempts at using humanitarian or pain-preventing methods is because they are prejudiced beforehand, having little faith in the statements of those advocating these methods. After a careful study of this question pro and con, I am compelled to say that I am in hearty sympathy with the disbelievers. They have been justified in a great measure in the position they have

assumed. Their justification, however, has not been in the correctness of the position taken by them, but rather in the failure of those who have written to point out carefully that a great amount of effort must be put forth before the results desired can be produced.

The men who are succeeding in this line of work are either those who have spent a number of years in carefully developing methods, or those who have been able to grasp the results obtained by others either by direct contact, or through a correct interpretation of their writings. In either case these men when they have written or spoken upon these subjects have fogotten to explain that to succeed requires time, patience and experience. The inexperienced one who has heard or read these papers has been led to believe that all that was necessary was to acquire the instruments, start to use them and results would follow. These instruments could not produce results without a most thorough understanding and execution of the technique involved in their use.

Lacking this and forgetting that time and experience are necessary to success in all things, they have failed in their first attempts, become disgusted and condemned not only the instruments and methods, but their advocates as well.

The name, humanitarian dentistry, is not all that is pleasing or desirable. While this is true, it is certainly less objectionable than that misnomer of painless dentistry used formerly by both legitimate practitioner and the quack, but today is being used solely by the charlatan "whose practice is neither painless nor yet dentistry."

Two kinds of dentistry were being practiced by the members of the true profession; that which considered first the thoroughness of the operation at hand, and second the comfort and power of endurance of the patient; and that which gave the patient first thought and consideration, the thoroughness of the operation second thought.

The former is the dentistry which has been practiced for years and is being practiced today by most men. The latter is of more recent origin and is being practiced by comparatively few men today. To it has been given the name of humanitarian dentistry.

Humanitarian dentistry while giving first thought and consideration to the comfort of the patient during the operation, "means dentistry as perfect and as thorough as the most exacting may demand, and yet so free from pain and suffering that the most timid patients will eagerly submit to such treatment."

The beginner in the practice of this kind of dentistry must understand that it cannot be learned in a few minutes, hours or days. It requires much time and experience. The men who are its strongest advocates and who are the most successful in practicing it, are men who have devoted years to perfecting themselves in this direction.

In practicing humanitarian dentistry, the operator must deal with both real and imaginary pain. He must be as successful in handling one as the other, else he is not a success in this line of work.

The first thing that presents itself to the dentist is the vivid imagination of the patients. This coupled with the fear and dread most people have of dentists, and dental operations, places many of the patients in a condition bordering on irresponsibility. This condition must be reckoned with before attempting anything else. To gain confidence, and dispel fear, must be the first thought of the dentist who desires to practice humanitarian dentistry. Many men fail here. Most men make light of the patients' fear and lack of confidence, and have no patience with patients who imagine that they are being hurt.

Success comes only when these patients are handled in a way which brings them to a position where they are capable of sound rational judgment. This is done in many ways, depending upon the individual case. First let your patients know that you are fully aware of their condition, and position in the matter, but impress upon them that they have your full sympathy, and that you are just as anxious not to hurt them, as they are not to be hurt. Tell them that in order not to hurt them, you are going to make use of methods and means which make it possible to do their work free from pain, but that in doing this you must have their hearty support. Caution them to notify you the moment they feel the slightest pain whatever. Make no promise to a patient which you do not expect to keep to the letter.

Cultivate a delicate touch. A touch can be cultivated which is both delicate and firm; a touch so light that it fails to irritate, and yet, so full of strength, and character, that it inspires confidence.

In preliminary examinations if a cavity is found, that is enough. Defer a complete examination as to the extent of that cavity until you have made an appointment to care for that particular case,

and have plenty of time to investigate and treat existing conditions.

If a patient is suffering, or has been suffering, do not go probing until you have obtained the history of the case. Gain from information furnished whether it is caused by sensitive dentin, pulpitis, or pericementitis. Then proceed in the most cautious manner, to confirm this history.

If the rubber is to be applied, and there is the least likelihood of causing the slightest pain, have your assistant bathe the gums for a few moments with a solution of cocain in adnephrin and water. If there is still danger of considerable difficulty in placing the rubber cloth have the time lengthened, and the cocain solution used until the gums show a blanching.

Then proceed with the utmost care not to cause pain in adjusting the rubber. This is of the greatest importance in many cases. Many times have I seen patients in such a nervous state by the time the dam was in place, that they were in no condition to be operated upon.

Having the rubber in place, dry away moisture, being careful not to cause pain in so doing. Cautiously open up the cavity and remove all debris, using sharp chisels and excavators, resorting to the use of the engine and bur as little as possible, until you have ascertained the kind, nature and sensitiveness of the cavity. The dental engine is one of the greatest bugbears to our patients, and should be used only when and where it is absolutely needed, and always when and where it can be used without causing pain.

In *learning* to practice humanitarian methods, time must not be considered. Results are what we are after. When we become skilled in producing results, then it is permissible to consider the question of time and the saving of same.

Having the cavity before us, and making a diagnosis as to whether it is sensitive or not, we are ready for the next step. It is the sensitive cavity only which concerns us at this point. We must judge whether it will yield to topical remedies, or whether cataphoresis, high pressure, or general anesthesia will be necessary to prepare the same painlessly.

All topical remedies should be applied warm to sensitive cavities. Alcohol should be warmed before applying, and after application every effort should be devoted to prevent evaporation taking place rapidly enough to cause pain.

The man who uses alcohol, chloroform, ethyl chlorid or ether in a sensitive cavity, to produce a condition which will permit cutting without causing pain, lacks all conception of what is required of him. He is a failure because he lacks judgment, speaking now from the standpoint of humanitarian dentistry. He is absolutely worthless as a worker in this field, unless he can be taught the folly of trying to kill one pain by first causing a greater one.

Humanitarian dentistry demands that all pain be eliminated, and a man is a success or failure just in proportion as he is able to do this. Producing pain at one time to avert it at another is not permissible. If the cavity before us is one requiring more than topical remedies, we must next decide which of the three remaining methods is best suited to the case.

Next to topical remedies, I will consider the method which my neighbor, Dr. C. G. Myers, presented to the profession. The first instruments were faulty, but he and others have made improvements until we now have a number of very good syringes for this purpose.

These instruments *properly* used make it possible to excavate the most sensitive teeth absolutely without pain. Failure in the use of this method is not the fault of the instrument unless the operator has abused it by careless manipulation. Careless manipulation means the bruising or bending of the needle point. The slightest injury to these points means inability to get proper adaptation and thus obtain sufficient pressure. A faulty or damaged point may cause many failures.

The drilling of the initial pit requires the utmost care, or a condition which courts failure is produced.

The instructions sent out by the various manufacturers must be followed to the very letter before success can be expected.

I use a No. ½ round bur, drilling with a light touch until the slightest sensation is felt, then I take a No. 2 bur and give just the slightest countersink to the cavity, and then apply high pressure.

In drilling the initial pit, stop and apply high pressure the moment the slightest sensation is experienced. After a few seconds remove the syringe and deepen the pit until sensation is felt, when a re-application of pressure anesthesia is made for a short time, and again drill till sensation is produced or until the pulp chamber is approached very closely if it is desired to remove the pulp. In

this case high pressure should be continued for some time prior to entering the chamber if the pulp is to be removed without causing pain.

If, on the other hand, it is a sensitive cavity that is to be prepared, then drill only deep enough into the tooth to get a good adjustment of the point, and at the same time reduce the resistance in the tooth substance till the solution may be forced deep enough to permit the preparing of the cavity without causing pain. No rule can be laid down giving either the depth of the pit or the length of time high pressure must be continued to procure results. The age of the patient and the size, condition and position of the cavity aid the experienced operator in judging this to a certain extent, but it is only the actual test which enables one to tell when sufficient anesthesia has been produced.

The test I use is to drill into the cavity a pit, or if a large cavity, to cut out and prepare that part of the cavity which is most removed from the point at which the injection is made. When that can be done, then it is safe to destroy the initial pit and proceed with the cavity preparation. If this method of procedure is followed, there need be no fear of injuring the pulp. There is no more excuse for injuring or endangering the life of the pulp than there is for the physician to injure or endanger the life of his patient in the administration of any of the many poisons that are used thousands of times daily in the treatment of various diseases.

It is simply a question of judgment and dosage. The average dose is administered, and increased or decreased until the desired result is obtained.

At the moment when that part of the cavity farthest from the point of injection can be prepared painlessly, high pressure should cease if the best results are to be obtained.

The pulp may be anesthetized with entire safety if necessary, but it is only in the most extreme cases that this is required. It is only when an over-dosage or an improper solution is used that much danger exists.

Many use the same strength solution for removing pulp and for preparing sensitive cavities. This is a grave mistake. Solutions for the removal of a pulp should contain a large percentage of adnephrin or adrenalin, while those for obtunding sensitive dentin

should contain but a small percentage, or in some cases none at all. The percentage of cocain is immaterial.

Another grave mistake is to think that this method requires but little time. I have obtained the most satisfactory results in fifteen minutes, and again in the same mouth on a corresponding tooth, with all conditions seeming the same, I have spent an hour to an hour and a half, and in some cases two hours and a half before getting the result desired. Such cases are rare, but they exist, and when we strike them, even the oldest and most experienced of us are both puzzled and disgusted. What then must be the feeling of the beginner when he meets cases of this kind?

Much injustice has been done both to humanitarian dentistry and to high pressure anesthesia by enthusiasts claiming this method suitable for all cases. It is but one means to an end. With it alone humanitarian dentistry must needs be a failure.

It is not that every tooth in the head cannot be reached and thoroughly anesthetized, but because in our intense desire to prevent pain we lose sight at the time of other things of equal importance. There are many cases where I consider it decidedly inhuman to drill an extra cavity which cannot be included in the original one, when other methods at command grant equal immunity from pain without loss of extra tooth substance. I refer to cataphoresis and the minor and major general anesthetic.

Of the methods for obtunding dentin cataphoresis offers most. There is no necessity for making extra cavities in the teeth when it is used. Your dosage can be gauged accurately. There is no danger of carrying poisonous ptomains into the pulp. There is no danger of mechanical injury to the pulp, and it can be applied to one tooth while another is being filled.

There have been great drawbacks to its general use.

There has been the difficulty of procuring a suitable apparatus. Many makes of instruments were palmed off on the profession, and most of them were about as well adapted to the needs of the present, as would be a stage coach in competing with our express trains. Some of them possessed merit, but the only one that was constructed along the right principle was one built according to the ideas of Dr. Weston A. Price of Cleveland. These instruments, when properly constructed, were all that could be asked. But, unfortunately, the building of them was placed in the hands of parties

who carelessly let a number of imperfect instruments slip through, and great harm was done thereby.

The second drawback has been the expense in procuring a perfect apparatus. Many looked upon the expenditure of a hundred or a hundred and fifty dollars in this direction as unwarranted. The truth is, that if a thoroughly reliable instrument cost twice the amount, it would be the best paying investment that could be placed in a dental office.

The amount of time required to properly insulate the cavity and make the application has been a drawback. Much of this loss of time is unnecessary. At first it takes time and plenty of it, but it is a thing that must be learned just as we learn to work gold or porcelain, and I would say to you that if learned and well learned, it will pay and pay better than will either of the others alone. There is nothing that the public will pay for so readily as the time spent in preventing pain.

A study of the case on hand permits the saving of much time by working on two parts of the mouth at the same time. For instance, if there are a number of teeth that require filling, open up a cavity in one, insulate it by applying a second piece of rubber over the cavity and covering any fillings with chloropercha, and then start cataphoresis on that case and while it is working open up other cavities on the other side of the mouth. Then, when filling the one, cataphoresis can be working on one of the others, which can be prepared for filling and left until the next sitting if necessary. Then while filling that one another can be obtunded.

Another way to save time is to start the instrument working and turn it over to your assistant while you work in the laboratory, or on another patient. The time consumed in this work is time well and profitably spent.

The difficulty experienced by most men in learning to handle this method is the greatest reason for failure in its use.

Not one man in a thousand has been able to grasp all the points necessary to complete success in using cataphoresis, and of those who have done so but few are capable of teaching it to others. I have heard possibly the best posted and one of the most successful users of this method make statements which were confusing, to say the least, and have seen clinics at his hands which were positively misleading, because things of vital importance were passed over

as of little value, and too simple to be neglected even by the most inexperienced.

No man who attempts to practice humanitarian dentistry can afford to be without a cataphoric outfit, nor can he be without a high-pressure syringe. Men fail with these because they will not devote sufficient time to study that they may become expert in their use. The busy man will not take time because he does not need to do so while his patients will submit to the old way. It is in the young men that the possibility of humanitarian dentistry lies.

Of general anesthesia, major and minor, I have little to say, because to my way of thinking their place lies only in the surgical field, that is, in extracting, opening up abscesses either through tooth or gums, and kindred operations. Many are using them in excavating sensitive dentin, and doing so with gratifying results, but it is very doubtful if such means will ever become very popular with the masses. Of the general anesthetics N_2O is the one par excellence for the dentists' use.

Many substitutes have been offered and with each there have been announcements of great discoveries, but in time all have been compelled to admit that nitrous oxid gas stands in a class by itself as far as safety is concerned. As to the duration of the surgical stage, all depends upon how it is administered and for what purpose. A number of men are using it with marked success in the preparation of sensitive cavities, placing the patient partially under its influence.

In all operations where freedom from pain cannot be obtained by the use of the means already cited, the best interests of humanity demand the use of general anesthetics even to the use of chloroform, if needs be.—*Dentist's Magazine.*

SOME NOTES ON THE RELATION OF DENTAL CONDITIONS TO PULMONARY TUBERCULOSIS. By F. Lawson Dodd, M.R.C.S., L.R.C.P., L.D.S., D.P.H., England. My work on the staff of a Metropolitan Hospital for Diseases of the Chest, with its sanatorium for the open-air treatment of phthisis, has led me to examine the possible relationship of the general disease with the local conditions obtaining in the mouth of the patient.

The modern treatment of pulmonary tuberculosis consists mainly in the removal of the patient from an unhealthy environment and

in placing him under such conditions as will favor success in the struggle against disease. The avoidance of all possible sources of infection is achieved by placing the patient in a germ-free atmosphere, and by keeping his surroundings scrupulously clean. Meanwhile the nutrition of the body is maintained—or aimed at, often unsuccessfully, for reasons which I shall state hereafter—by a plentiful food supply added to as large a measure as possible of physiological rest.

Such treatment will at once arouse the interest and demand the assistance of the dental surgeon. Investigation from our standpoint will show, if my own experience is in any way to be regarded as reliable, that a large proportion of the modern treatment of consumption is but a cleansing of the outside of the cup and platter; a system of removing some of the more remote obstacles to progress while the more intimate and personal dangers are entirely overlooked.

The valuable investigations of Dr. Miller, in Berlin, and, nearer home, of Mr. Goadby and others, have shown, once and for all, that the human mouth is a perfect breeding ground, suited alike by temperature, moisture, and the presence of an endless supply of nutrient material, of a flora of organisms extraordinary in its number and variety. Though Koch's bacillus, apart from its presence in actual sputum from the lungs, is found comparatively rarely, due mainly to its weakness in the struggle for existence against endless foes, the bacterial flora of the human mouth contains pathogenic as well as non-pathogenic organisms. In apparently healthy persons, the pneumococcus, the micrococcus tetragenus, staphylococcus and streptococcus pyogenes, and the Klebs Loeffler bacillus have all been found. These organisms, some of which are characteristic of certain well-known diseases of the air passages, may all gain entrance to the system by inhalation, swallowing, through exposed wounds of the tissues of the mouth, or through exposed and necrosed tooth pulps. It is not claimed that hygienic care of the mouth will remove all of these organisms, but it will lessen their number and the chances of infection.

A great deal of indisputable evidence has been adduced to show the connection between oral sepsis and general infection. Pernicious anemia and chlorosis have been attributed to this cause. Diphtheria has been associated in the same way. Recently I saw

two alleged cases of influenza which were cured immediately by the opening of subacute abscesses in connection with incisor teeth, the rise of temperature and other symptoms being due to septic infection.

But whatever may be said in regard to specific septic infection taking place through the mouth and teeth, there is no doubt as to the existence of secondary anemia, associated with lowered vitality, and great foulness of the whole alimentary tract, resulting directly from buccal infection. In such cases not only is there local absorption of toxins through the mucous membrane of the mouth and the alveoli of the teeth, but the infection with staphylococci is a continuous process throughout the alimentary canal. As in the case of constant soaking with yeast toxin, the tissues are rendered suitable for the growth of the bacillus of tuberculosis by being bathed continually with the toxin of organisms whose breeding ground is the mouth. Just as the remedy for chlorosis was said to consist in the cleansing of the lower end of the intestine, so we may claim that the cleansing of the mouth is of equal importance. It is a safe aphorism—look after the two ends of the alimentary canal and the middle will look after itself.

All that has been said in reference to the part played by oral sepsis in the production of phthisis in adults may be repeated with greater emphasis in the case of children. They are more susceptible of diseases of the respiratory organs and of tuberculosis in particular. Of 586 children examined during an outbreak of diphtheria, 458 showed some signs of mouth disease; ranging from simple hyperemia of the mucous membrane of the mouth and throat, to hypertrophy of the tonsils with adenoids, etc., and 88 per cent of the children had carious teeth. My own observations have shown me the simultaneous existence of carious teeth and exposed nerves in cases of the children admitted to those institutions. It is true that we can draw only inferences from such facts, but they are sufficient to bring out the importance of removing every possible cause of disease.

We are on firmer ground when we assert that mouth breathing is a very potent and common contributory cause of phthisis, and in many cases this pernicious habit is formed as the result of carious teeth in early life. An exposed nerve, or tender septic gums render mastication impossible, the child is afraid to close its jaws, and not

only acquires the habit of bolting its food, but also, to avoid possible painful contact of the teeth, keeps them open sufficiently to part the lips and commence to breathe through the aperture thus formed. The part played by oral sepsis in enlarging the tonsils will itself favor this dangerous habit.

I think we may reasonably say that whatever influence oral sepsis may have in the production of phthisis the first aim in its treatment should be the reduction of infective processes, and the inculcation into the patient of the importance of scrupulous cleanliness of the mouth.

The second factor in the treatment of phthisis is the proper nourishment of the tissues. Just as immense trouble and expense have been incurred at our sanatoria to produce germ-free surroundings, so nothing is spared in the feeding of the patients. Large quantities of food are consumed; how much is assimilated is not so much a matter of consideration. The important researches carried out in America by Mr. Horace Fletcher on the question of oral digestion and its relation to health and disease, and the intimate connection shown to exist between mastication and nutrition, both emphasize the importance of carefully considering the condition of the teeth in cases of phthisis. Such considerations in the light of modern experience have led me to believe that here again there is great waste of effort.

The nutritional treatment of phthisis must depend upon two factors; the presence of appetite and the power to assimilate the food taken.

In combating anorexia, attention to the teeth and mouth is all important. Septic mouths, coated tongues, local suppuration of the gums, pyorrhea alveolaris, suppurative periodontitis, all destroy the desire for food by their effect on the mucous membrane of the tongue and fauces, chiefly by impairing taste, and also by infection of the stomach and intestine. According to Miller it is erroneous to imagine that organisms bred in the mouth necessarily perish in the stomach. It is certain that normal gastric juice does not destroy the virulence of the tubercle bacillus when swallowed by careless or weak patients with the sputum. This cause of loss of appetite will be better understood by quoting briefly from a recent work by Miller. "From neglected mouths such as frequently come under the notice of dentists, enormous quantities of bacteria must

reach the intestinal tract in spite of the sterilization of the food. In a very unclean mouth examined for this purpose I estimated by culture methods the number of cultural bacteria at 1,140,000,000. Many of these doubtless were carried to the stomach during every meal, to be replaced by others developing between meals and over night." In a well-managed sanatorium an aseptic food supply may have been attained—even the milk consumed may be free from tubercle bacilli; but all these precautions may be a delusion and a snare if the patient is chewing his food before swallowing it, in such a charnel-house as the above words describe, and which unquestionably depict a very common state of things. It is a waste of public money to increase the diet in such cases without at the same time insisting on conditions of oral cleanliness among those undergoing the open-air treatment for consumption. It is better in many cases freely to remove diseased teeth than to leave them in the condition one finds them in the mouths of a considerable proportion of our patients.

It is necessary to touch only briefly upon the necessity of seeing that patients possess the power to assimilate the food given. The loss of masticating power, with or without the habit of bolting the food, is a serious handicap to the phthisical patient, and therefore an important part of the treatment must consist in replacing lost teeth. Where this is not practicable it is well to remember that with soft food much may be done by working it between the tongue and hard palate, so as to incorporate it thoroughly with saliva and give time for oral digestion. This can be done safely only where oral hygiene is attended to.

Although enlargement or lymphadenomata connected with the glands of the neck in all cases cannot be connected with septic conditions of the mouth and teeth, there is certainly evidence pointing to a connection between the two conditions. It is well known that this kind of chronic lymphadenitis in children often leads to a tubercular infection first of the gland-substance and afterwards of the whole system. Such as these seem to illustrate the contention that the lowered vitality of local tissues renders them more susceptible of specific infections.

The glands which receive the lymphatics of the maxillary teeth are the deep and superficial parotid group; those receiving the

lymphatics of the mandibular teeth being the submaxillary and sternomastoid (superficial) group.

Odenthal, of Bonn, has investigated the relationship between chronic enlargement of the glands of the neck and carious condition of the teeth. He examined 987 children; 429 had carious teeth, and of these 424 had glandular swellings, or 99 per cent; 558 had no decayed teeth, and there were 275 cases of glandular swelling, or 49 per cent. Gland swellings were more pronounced where pulps were exposed, and, as a rule, it might be said, the more decayed the teeth, the greater the swelling. Also, decayed teeth on both sides showed swollen glands on both sides.

Hoppe, of Leipzig, found in 269 cases the absence of glandular swellings and carious teeth in only 4.4 per cent. In 73.9 per cent glandular swellings were present, and in nearly all instances were associated with carious teeth. The percentage of children with carious teeth and without glandular swellings was 21.5.

This condition of lowered tissue resistance from continued infection need not be accounted for solely on account of dental caries. Sepsis may be found apart from caries, and frequently produces a temporary glandular inflammation, as in the case of the so-called stomatitic ulcers. In some of the recorded milk epidemics, acute lymphadenitis in the neck frequently has followed the taking of the unwholesome food; and in one such case which I saw, the glands broke down in a manner identical with tubercular infection.

There is evidence to show that tubercular infection of these glands may take place directly through the pulp canals of the teeth. Miller quotes a case, communicated by Ungar, in which tubercular ulceration of the gums followed by a swelling of the lymphatic glands had formed around a badly decayed cuspid. The circumstances were such as to leave no doubt that the tubercular infection of the lymphatic glands of the submaxillary region, and consequently the infection of the whole system, stood in close relation to that observed around the decayed tooth.

Starck records a case of a boy, aged 18, who previously had been healthy, developing tuberculous glands; carious molars were present on both sides. The glands were removed and the teeth extracted. Cover glass preparations from both glands and teeth showed the presence of tubercle bacilli.

Professor Pärtch records the clearest case of direct tuberculous

infection through carious teeth, a case so full of interest that perhaps I may be allowed to quote rather fully from the *Medical Review* of March, 1905:

"A previously healthy girl, aged 14½, in November, 1903, had pain in a carious left first lower molar. Tooth loose with a large carious cavity on inner side (lingual). Tooth was tender to percussion. The soft parts over the horizontal ramus of lower jaw on left side were swollen. Attempts were made to treat without extraction, but by January 15 the tooth had become loose and was still painful and tender. On pressure pus welled up on its outer side. The submaxillary gland was large, hence the tooth was extracted and, contrary to expectation, the periostitis and lymphadenitis became worse. On January 28 a second enlarged gland appeared under the angle of the jaw, and there was great swelling of the face. The lower edge of the horizontal ramus was thickened. The extraction wound had not healed by March 8; there was then no secretion of pus, but the edges were reddened and swollen. At this time the patient appeared healthy but for the local trouble. The inter-alveolar septum between the first and second left lower molar was absent, and the latter tooth was loosened. The submaxillary glands and one of the anterior superior cervical glands were enlarged. In spite of oral asepsis and hot applications to the glands there was no improvement. There were occasional evening rises of temperature not exceeding 100.6 degrees F. The failure of treatment, combined with the fact that the infection of the glands had passed from one system to another (in simple periodontitis, the glands in connection with the infected teeth alone enlarge), indicated a serious disease. On March 22 the affected glands were excised and found to be the seat of tubercular infection, carious bone was found under the mandibular periosteum. The cervical wound healed by first intention, and the patient's general health was satisfactory, and weight had been gained."

The diagnosis of this case was confirmed by microscopical examinations, and in sections of the second lower molar it could be seen that the tuberculous process had first attacked the periodontal membrane.

In two cases of enlarged glands of the neck, recorded in the *Medical Press* in 1897, there was evidence of their relation to general tuberculosis. There was no family history. Enlargement fol-

lowed toothache in one case, and tubercle bacilli were found in the carious molar teeth; in the other a suspicious-looking granulation was found between the roots of a molar which, on section, showed tubercle with giant cells.

Dr. Latham recently has expressed the opinion that infection with tubercle generally takes place through the mouth, either with the food or air. Such cases at least warn us of the possibility of serious general infection, breaking through the lymphatic barriers, already lowered in resisting power by repeated attacks of the commoner product of oral bacteria; and it should not be forgotten that the study of the relation between oral sepsis and general disease is at present in its infancy, as is proved by the obscurity that still hangs around the etiology of cervical lymphadenitis.

I do not pretend to say that the evidence for general infection with tubercle through carious teeth is either satisfactory or complete, yet the danger of oral neglect is made at least more serious by such records. If primary general infection is rare, we must not forget that the resistance of the buccal tissues is overcome in primary local infections, such as lupus and the rarer tubercular ulcers of the mouth. It is interesting to note that in the case of the domestic pig, which is a notoriously dirty feeder, tubercular infection is very common, and meat inspectors find that the glandular system—frequently in the cervical region—is commonly the seat of the disease.

Having considered the question of primary infection through the mouth and teeth, it is well to bear in mind the possibility of secondary local infection in cases of pulmonary tuberculosis. This may, and frequently does, take place through the mucous membrane of the mouth, and an important part of any treatment must consist in its prophylaxis. Secondary infection through pulp canals is rare, for the following reasons:

(1) The protective covering of mucus.

(2) The hostility of the common organisms of caries to the development of *B. tuberculosis.*

(3) The absence of lymphatics in the tooth pulp.

(4) The layer of granulation tissue around the apical end of a tooth with a gangrenous pulp which acts as a barrier against further infection with tubercle.

The effectiveness of all these protective agencies varies according

to the vitality and power of resistance of the tissues against the particular organisms in question.

According to Zandy, of thirty-seven cases of alveolar tuberculosis, infection spread directly in three cases of lupus. In the majority of the rest the buccal mucosa was attacked first, spreading to gums and teeth later. In five of the thirty-seven, tubercular ulcer commenced at the seat of extraction of the teeth. Zandy agrees with Starck that caries of the jaw may result from infection between teeth and gums, or through the pulp of a carious tooth.

I am indebted to Mr. J. G. Turner for the following interesting case of secondary infection through a tooth:

The patient, a male, aged 25 years, suffered from chronic pulmonary tuberculosis with bacilli present in the sputum. The second right lower molar was carious and the pulp had become gangrenous with suppurative periodontitis. This ended in a subcutaneous cold abscess over the lower border of the mandible communicating with the affected tooth only after opening with a probe. Pure cultures of tubercle bacillus were obtained from this abscess after injecting the pus into a guinea-pig.

I recently saw a case of secondary infection of the dorsum of the tongue occurring in advanced phthisis, apparently caused by continual flow of infective sputum over its fissured and somewhat dry surface.

Carious teeth with sharp edges may wound the buccal mucosa and afford a means of entrance for secondary tubercular infection of the tongue or cheek. With a constant flow of expectoration from the lungs through the mouth, the importance of removing such sharp or irregular teeth cannot be exaggerated. For even though the specific organism may not get a hold, the infective condition of the mouth, added to its soreness and discomfort, will seriously impede the progress of the patient. Dental treatment may do much towards restricting the spread of infection, especially reinfection with the primary cause of the disease.

The part played by the mouth and teeth in the production of primary and secondary tubercular infection having been referred to, there remains another aspect of the question, of importance alike to the dentist and the physician, viz., the added difficulty of successful diagnosis of pulmonary disease experienced in cases where the state of the mouth is neglected and septic.

This may come about in two ways: from the hawking up from the fauces of mucopurulent material which may simulate the expectoration of phthisis or bronchectasis, but which is really traceable to local suppuration connected with the teeth or gums: or from the ready bleeding of spongy gums which may simulate hemoptysis.

Both these conditions may be blended, as in a case recorded by Mr. Rickman Godlee, of which I append a summary.

The patient, a lady about 40, complained of offensive expectoration for years, "lumps of green, and yellow stuff." From December, 1897, to December, 1898, this expectoration was blood-stained. There were no physical signs except slight retraction of the right posterior base with lessened movements. There were increased resistance on percussion and weak breath sounds. Her principal complaint was that she had this extremely offensive expectoration, amounting to five or six ounces in the twenty-four hours. It was not coughed up exactly, but hawked up from the back of the throat. She was much troubled by the foul taste, and by the fact that her breath was offensive to others. The expectoration almost always was blood-stained, and separated into two layers, the upper a bright red, but containing very few, if any, blood corpuscles; the lower white and looking like pus. It consisted, however, almost entirely of squamous epithelium.

It was quite clear, therefore, that it came not from the lungs, but from the mouth or upper air passages. These were all examined with great care and suppurative periodontitis found to be present. This was treated and the expectoration completely stopped. The digestion and general health improved remarkably, and not the least benefit was the release from the constant mental worry resulting from the disease.

I hope I have at least established the claim that our position as dental surgeons is of importance in connection with the treatment as well as the prevention of tubercular infection, both local and general. It is for us to maintain that all the expensive schemes for the open-air treatment of pulmonary tuberculosis are largely handicapped unless radical measures are taken to render clean and efficient the mouths of the patients admitted. Surgical cleanliness of the mouth and teeth may be reached by proper operative treatment, but this alone is useless unless a rule of cleanliness with

regard to the brushing of the teeth and gums is insisted upon, and its execution supervised. Observation has confirmed this necessity.

There is every reason to think that the condition of the mouth and teeth of the inmates of open-air sanatoria and hospitals for diseases of the chest is very unsatisfactory. Mr. H. B. Ezard drew attention to the state of the teeth of the patients at a sanatorium in which he himself was undergoing treatment. As a result he found that of 192 possible molars, 12 were in action: "taking the average age 26, out of 32 teeth only 8 were in action, *i. e.*, 75 per cent of the first process of nutrition had been lost."

I have examined recently the mouths of patients under treatment at Mount Vernon Hospital for Diseases of the Chest, and also at its Northwood Sanatorium. I saw 72 at Hampstead and 53 at Northwood. At Hempstead 39 were females and 33 males, but for statistical purposes six cases under 12 years of age, whose permanent teeth were not fully erupted, have been omitted. In four of these six cases there were "dead" teeth, or exposed pulps, associated with marked oral sepsis. For the rest, in reckoning the number of teeth missing, I have calculated on a basis of a total of 32 teeth for all patients over 20 years of age, and 28 teeth for those between 13 and 20 years.

The 35 women examined at Hampstead, all between the ages of 13 and 40 years, should normally have 1,088 teeth. Of these 179 were decayed and 282 either missing or so badly decayed as to be useless for mastication—a total of 461 missing or diseased out of 1,088, or rather over 42 per cent of these 35 patients; 16 showed the presence of "dead" teeth or exposed pulps, and in many mouths the number of such lesions was quite considerable. One patient was wearing an artificial denture which she was unable and unwilling to have removed for the purpose of cleaning. On the whole there were signs that these patients had made some attempt to keep their mouths in a cleanly condition.

The number of male patients examined was 31. These should show normally a total of 976 teeth. They ranged in age from 13 to 54 years, but were mostly between 20 and 35 years. Of this possible total of 976 teeth, 175 were carious and 263 were missing or so badly gone as to be useless. That is, of 976 teeth 438 were either decayed or missing, a percentage of 45; 19 cases had exposed pulps or "dead" and foul teeth and stumps; 22 cases were in a very

dirty and neglected condition, and in 17 mouths there was more or less well-marked pyorrhœa alveolaris. Unlike the female mouths these, as a whole, were entirely neglected, and the task of examination was often most offensive, owing to their extremely septic condition.

At Northwood I examined 53 patients: 28 male and 25 female. The average age of the 28 males was 25½ years. In nine cases the mouths were very neglected and dirty. Of a possible total of 870 teeth 139 were missing and 181 decayed, *i. e.*, 370 teeth were either decayed or missing, a proportion of 42.5 of the total masticating power.

The 25 female patients, whose average age was 22½ years, showed, out of a possible total of 780 teeth, 270 either decayed or missing, *i. e.*, about 36 per cent. Ten patients had foul stumps or "dead" teeth in their mouths, although, as was the case at Hampstead, they seemed more careful and cleanly than the male patients.

It should be remembered that the mere number of missing teeth reveals the true condition in a partial way only, for when the teeth lost in one jaw do not correspond to those lost in the opposing one, the deficiency is more serious than appears from the figures. The decayed and crownless teeth also represent a great amount of sepsis, and, in fact, in many mouths the foulness was notable, even though the patient had obviously done his best with the brush.

If this represents the prevailing condition in all institutions of the same character, and I see no reason to believe otherwise, then it is high time that serious attention should be drawn to it, and that something drastic should be done to remedy an intolerable state of things.—*British Journal Dental Science.*

SILICATE CEMENTS VERSUS PORCELAIN FILLINGS. By L. M. Markham, M. B., B. S., L. D. S., Eng., Newcastle-on-Tyne, England. The subject of my paper was to be porcelain fillings, but having in mind recent developments in filling materials, I feel that I cannot proceed without first disposing of the question as to whether porcelain fillings are superseded and have become unnecessary and obsolete. As the operation of filling a tooth with porcelain is not always an easy task, it is obvious that a

plastic filling material which in appearance and durability equals porcelain will always be used in preference to the latter. There are at present on the market several silicate cements which, so it is claimed, possess all the properties than can be desired of a filling material; if the statements made be true, then conservative dentistry has made a great advance. Here are some of those statements culled from literature accompanying the cements, or appearing among the advertisements in dental journals:

"It is unassailable by the fluids of the mouth."

"Is a perfect substitute for the inlay, and is indissoluble in the mouth."

"Does not shrink;" "is not in the least brittle."

"Combines and adheres with the dentin of the tooth without sticking to the filling instruments."

"Unites perfectly with walls or edges of cavity."

"Is worked quite as easily as any other cement."

"Will cause no injury or irritation to the tooth."

"Contains no injurious ingredient."

Before giving up the insertion of gold and porcelain in favor of fillings of silicate cements, I have thought it advisable to be absolutely sure that such a step would be justified by the results. Feeling just a little skeptical, having heard of insoluble cements before, I have submitted some of these fillings to such tests as would enable me to give them their proper place in my list of filling materials.

The points on which I wanted information are as follows: (1) Their insolubility; (2) absence of shrinkage after setting; (3) their peculiar disadvantages, if any exist.

The beautiful appearance of these fillings is beyond criticism.

Insolubility.—To determine this question plugs of silicate cements were suspended in a 0.5 per cent solution of lactic acid; for the purpose of comparison an oxyphosphate was submitted to the same test. The silicates soon lost their translucency and became coated with a fine, white powder easily wiped away, which had a gritty feeling when ground between the teeth. The oxyphosphate lost bulk more rapidly, was unchanged in appearance, and set free particles which appeared as a sediment at the bottom of the vessel.

I owe to having heard Mr. Coltman read a paper on the subject of one of these cements, the information that, when set, it consists of particles of oxid of silicon united by the oxyphosphates of zinc and berylium; their behavior in the acid solution would lead one to suppose that the oxyphosphates dissolve out, leaving the silica free upon the surface. I believe that the liquid of all these cements contains phosphoric acid. In the mouth the fillings being exposed to washing and friction would, beyond losing their high polish, remain unaltered in appearance. The percentage loss of weight of the oxyphosphate was about double that of the silica cement.

In alkaline solution—0.5 per cent, sod. carb.—silicate and oxyphosphate alike showed no loss of weight; in fact, they both gained a few milligrammes. I submit a detailed account of the tests. I have reached the conclusion that, although they will last longer than oxyphosphates, the silicate cements cannot be classed as permanent fillings.

Shrinkage.—Do they shrink? Yes, they do. I tested three, one of which is declared not to shrink. The contraction is clearly apparent the day after insertion. Oxyphosphate also shrinks, but not to the same degree. A space at the gum margin caused by contraction, favoring the retention of food and the occurrence of fermentation, may account for the more rapid solution of cements in this situation. Whether the contraction of the cement in a filling of average size is sufficient to lead to the recurrence of caries I cannot definitely say, but it certainly cannot everywhere in the cavity unite perfectly with the walls or edges, nor adhere and combine with the dentin. It seems possible that, by inserting a porcelain or glass core in the cement, the shrinkage might be greatly diminished.

Disadvantages Peculiar to Silicate Cements.—The objection that silicate fillings require special instruments for their successful insertion applies equally to fillings of gold, and of course is unreasonable; silicate cements, however, when mixed to proper consistence will not flow; hence, it is difficult, if not impossible, to completely fill sharp undercuts, but by filling them with oxyphosphate and inserting the silicate when both are plastic, success is assured; the two cements combine and adhere strongly together.

Being of the opinion that porcelain fillings are still required, and seeing that they form the title of this paper, I will say just a few words about them.

At first, justified only on account of their appearance, porcelain fillings now share the respect that was in former times paid to those of gold alone. The only valid objection that could be urged against them has been the line of cement exposed at their junction with the tooth; it has been found that solution of the cement, beyond the extent of a slight depression, occurs only when the joint is subjected to abrasion, as well as to contact with fluids.

Porcelain fillings are of two kinds; those ready-made, the cavity intended for their reception being fashioned to contain them; and those molded to fit the prepared cavity, known as fused porcelain inlays.

Ready-made Inlays.—Before the preparation of fused porcelain inlays reached its present perfection and simplicity the need for porcelain fillings was felt, and was met by grinding pieces of porcelain to the required shape; later, various rods, tapering and straight, circular and quadrilateral, were introduced, the idea being to prepare by means of files or burs a cavity to fit as accurately as possible some portion of these rods. As the shape and size of all cavities are, or ought to be, regulated, not by the filling to be inserted, but by the extent of caries, the amount of preparation necessary to secure strong and properly shaped enamel walls and edges, by the consideration of recurrent caries and the means taken for its prevention, it is obvious that to have the shape, and to a great extent the size, of the cavity fixed and unalterable is a serious hindrance to the attainment of a perfect filling; and, again, the perfect finishing of such a material as porcelain after insertion at some margins is difficult, if not impossible. The only class of ready-made inlay that in my opinion should be used is the round tapering rod. The only situations suitable for it of common occurrence are simple labial cavities, where a perfectly circular shape is indicated, and can easily be obtained without any needless mutilation.

The molded porcelain inlay is indicated in incisors, and in the mesial surfaces of canines and premolars, in all cavities whose

margins approach the labial surface of the tooth. Cavities below this size, for porcelain, require separation of the contiguous teeth by 1¼ times the thickness of the inlay, are difficult to fill, and when filled the inlay being shut off from all direct illumination looks much darker than one would expect; to my mind, nothing is so satisfactory for these cavities as a combination filling of cohesive gold and cement. In filling cavities in premolars or molars no attempt should be made to include fissures in the inlay; they should be filled with cement and amalgam or gold; if with gold the filling should be continued into a fissure molded in the inlay. It soon becomes impressed upon one in porcelain work that bulk is necessary to ensure success; for this reason tips of incisors, unless made so long as would in young persons endanger the vitality of the pulp, are more satisfactory when restored with gold.

Porcelain inlay work leaves it mark upon other filling operations. It has taught me to nearly always employ cement as a lining when filling teeth, and to rely upon the union of cement with other filling materials. The preparation of cavities for porcelain encourages one to be bolder when shaping those intended for other materials, thus anticipating and preventing the recurrence of caries. Having, by the addition of porcelain to our list, more materials at command, the question of suitability can be more critically considered; and by the insertion of any one when indications are favorable only, all of them are used with increased confidence and respect.—*British Dental Journal.*

CARE OF THE EYES AND EYESIGHT BY MEMBERS OF THE DENTAL PROFESSION. By Casey A. Wood, M.D., D.C.L., Chicago, Ill. I need not draw your attention to the fact that dental practice involves the use of the eyes to an extent entirely unlike that of most other professions and industries. From this standpoint the population might be divided into three classes. Among the first class are those who use their eyes constantly, or nearly constantly, for looking off in the distance. As examples of this class one finds the farmer, the engineman, the land surveyor, the sailor, etc.

Second, the class that uses the ocular apparatus about one-half

the time for looking off in the distance and the other half for rather constant, close work.

Third, the class to which the great majority of the members of the dental profession, in common with bookkeepers, watchmakers, stenographers, compositors, etc., belong.

I might add that probably the great majority of workers in the large cities form part of the third class; indeed, it is very difficult in modern times to find urban work for a man or woman that does not involve almost constant use of the eyes for near work. I fancy we shall arrive at a better idea of the character and consequences of this work if we remember that each eye-ball is a sort of camera, and every time one looks close at hand he, in a certain way, strains his eyes. This strain is an abnormal one, because there is really no adequate arrangement in the normal eye for continued accommodation for near objects. It is quite true that the focusing apparatus is much more perfect in man than in any of the lower animals, but fixation for near seeing is an act that has to be learned by the child; the ability to perform it was not born with him. Moreover, to do it well requires practice for a number of years. You all know that the infant is incapable of binocular vision, that is to say, single vision with the two eyes is not accomplished by most children until the third month, in some cases not until the sixth month, and occasionally not until the child is a year old. Again, if one is far-sighted or astigmatic (and most of us present one or both of these forms of refraction) the attempt to see distinctly with both eyes at close range is still more productive of eye strain.

With this incomplete introduction of the subject let me say that I would like to divide it into two or three categories. First of all, I should like to speak of the *student of dentistry.* Like other students or, perhaps, more than other students, it is necessary that he should do near work all day long. When he is not reading text books or writing lecture notes, or doing microscopical or bacteriological work, he is examining minutely the mouth and teeth of patients. Consequently the fact that strikes me as important in the case of a dental student is that he should begin his college work with a good pair of eyes. If he is far-sighted or astigmatic or has any other defect that can be cured or relieved, attention should be given to his eyes early in his studies. If he has an in-

curable disease of the eye, or has a defect that makes it impossible to use his eyes for long periods, then I would strongly advise him to abandon or never attempt the study of dentistry. I not infrequently have as a patient a dental student complaining of headaches or pains in the eyes or defective vision, because of an undetected error of refraction or an eye-muscle defect that has not been remedied. Still more unfortunate is it to be consulted by a dental student who has had a complete breakdown in attempting to use his diseased or defective eyes for continuous near work. A short time ago I examined a second-year student who, while he had normal vision with one eye, had very defective sight in the other. In the weaker eye there was a congenital condition which made it impossible for him to have binocular vision. He complained after working either with a patient in the dental chair or reading much at night time that his head commenced to ache and that objects in front of him became blurred or indistinct. I advised him very positively not to persevere in his studies, or at least to undertake some department of practice that would not involve the continuous use of his eyes for near work.

Let me repeat that before the dental student is allowed to undertake the arduous curriculum (as a preliminary to still more exacting use of his eyes) that he should have his whole ocular apparatus carefully examined.

Let us consider now the *dentist,* after he has received his diploma and settles down for the practice of his profession. Assuming that his eyes are in the best condition possible for the work which he will find it necessary to do, I regard the *illumination* by the aid of which he expects to do his work, probably the most important consideration. It may be stated at the outset that *natural light of the diffused variety,* that is, not direct sunlight, is the best form of illumination for the dentist's work. When there is any choice in the matter artificial light should never be employed for the difficult work that the dentist's eyes are called upon to do. Should it be necessary to use artificial light, the modified electric light, or, better still, gas, is preferable. Of course, these considerations will not be appreciated by men with good, strong eye muscles, normal eyes (eye-balls that are neither too far-sighted nor astigmatic), a stable nervous system and a good digestive apparatus, or who are under forty years of age. As soon as any of these factors are lacking

then will the dentist know what is meant by a poor illumination. The old rule laid down by Magnus obtains with peculiar force in the practice of dentistry, namely, that in all near work especially the *illumination should neither be too strong nor too weak; it should imitate as nearly as possible diffused sunlight, and it should always shine upon the work to be done and never, either directly or by reflection, into the eyes of the operator.* I have noticed in a number of dental offices that a strong light is thrown into the mouth of the patient as well as into the eyes of the dentist. This is one of the worst mistakes that can possibly be made by any man doing continuous close work. While it is quite proper to have an effective light falling upon one's work, the eyes of the operator should be in comparative darkness. If the near-worker is to preserve his eyesight until old age he should not abuse his eyes by neglecting this rule. There is no question but that, especially after 40 years of age, the man who misuses his eyes in this way is more liable to cataract, disease of the choroid and retina and to a sort of dulling of sight due to degeneration of the optic fibres.

The *use of glasses* is an important matter to the dentist. We often hear a man boast of his good *distant* vision. Time and time again one listens to people telling of their capacity to see a church clock three miles away, when other people are unable to distinguish its outlines. These as a rule are people who are far-sighted, i. e., those who at, say, 25 years of age, possess unusually good vision for the distance. It so happens, however, that it is the worst possible kind of sight that a man can have if he is obliged all day long to do near work. The fact is that a slight degree of nearsightedness (myopia) is much preferable than any form of farsightedness. The dentist's work lies within a range of a meter or two; he is rarely interested in anything more than twenty feet away, and his vision should be adapted to these conditions. If, therefore, he has an appreciable amount of far-sightedness it ought to be neutralized by means of appropriate glasses. The same thing is true of astigmatism (a deviation from the normal shape of the eye-ball) and is particularly true of astigmatism combined with hypermetropia or other curable defect. These glasses, in the majority of cases, might be called "operating" glasses, and inasmuch as they enable the eye to see close at hand with the least amount of strain, might in the majority of cases be used only while work is being done.

In this connection there is an old superstitution that if you put on glasses early you will not be able to do without them and that something dreadful will happen in consequence of this "slavery to habit." There never was a more mistaken idea, because no man by merely "taking thought" can really cure a defect due to an abnormal shape or a deviation from the normal shape and size of the eye-ball. The *early* use of glasses is of much use to the far-sighted individual who persists in using his eyes much for near work.

There is another well recognized rule that will enable most people to decide whether they need glasses for their near work. When an individual finds that he can not, at ten inches in front of him, read, in a dim light, "diamond" print with each eye separately, he ought to have glasses to assist him in his work. Nothing is to be gained by waiting, because the eye is being strained in the meantime. Of course, if one will give up near work and live an outdoor life for nine months out of the year, glasses of this description are not necessary and would be entirely superfluous, but when the dentist, the oculist, bookkeeper, stenographer, *et hoc genus omne* persist in working all day long for eleven months out of the year, special arrangements are generally necessary for such abuse of the eye.

The man who persists in using his eyes for the great majority of the working hours at close range, cannot afford to further abuse them by reading badly printed newspapers with a poor light, or to read on railways trains and street cars (as most of us do) or do much reading while lying down. I do not say that reading for half an hour in a prone position makes any great difference with the average individual, but this habit indulged in for several hours at a time increases the congestion of the interior of the eye, and sooner or later produces changes in the eye itself.

Finally, one of the exciting causes of eye strain, especially in students, is too long hours and lack of recreation. I mean lack of that particular form of recreation that gives the eye a rest. From an ocular standpoint it is a great mistake to work in a downtown office all day and then take recreation by going home to read a book or magazine. Far better to emulate the example of your chairman by an excursion into the woods or by taking a fishing excursion, or, in winter, going for long walks. Choose one of these forms of

recreation as an investment. Do it because you feel that you owe it to your eyes. You use your eyes more in doing your daily work than you do any other organ of the body. Possibly we are all obliged to do a great deal of talking, but the tongue does not suffer from tongue-strain as the eyes do from eye-strain. If you will give your eyes a chance to recuperate you will subsequently do better work, and, possibly, just as much work as if you had tired them out in the operating chair for a few hours longer. You ought then to neutralize any possible damage to your eyes by taking pleasurable excursions. Such a course will calm your nervous system, act as a tonic to your muscles, increase your digestive power and thus indirectly furnish you with more competent eyesight.

I need hardly suggest to gentlemen in your profession that the moment any eye symptom or eye defect is noticed you should at once repair to the oculist for counsel. Nobody knows better than the dentist how people neglect their teeth, but, on the other hand, it is possible to be fitted with artificial organs of that variety. We may purchase new teeth, but we cannot purchase new eyes. A short time ago there came to me a dentist from a neighboring town who had a very good practice, and whose history was one of defiance of every law of health, general and ocular. He began his college life with poor eyes and suffered from eye-strain, headaches, inflammatory signs of ocular disease, and so on. Now, at an early age, he has developed cataract in both eyes (as the result of chronic choroiditis) due to nothing more nor less than a downright abuse of his eyes and nervous system. He at first thought the choroidal disease was a temporary, unimportant trouble and did nothing for it. I am sure that the disease itself and the consequent cataract might have been prevented and that he might still be pursuing his hitherto successful career, if he had paid ordinary attention to his general health and to the condition of his eyes.—*Dental Review.*

CYSTS OF THE ORAL CAVITY; RANULA. By Vida A. Latham, M.D., D.D.S., F.L.S., F.R.M.S., Chicago, Ill. The term, ranula, is probably one of the oldest in surgery and its etymology is not very obvious. It seems to be synonymous with batrachus, or frog tongue (Gr. *batrachos,* frog), coming from Lat. *rana,* frog.

It has been restricted by some to obstructions of Wharton's duct, and by others to obstructions of the sublingual ducts.

As there are a number of cysts, it may not be out of place to recall briefly the main classification:

(1) Sebaceous Cysts or Wens. *Skin.*

(2) Sudoriparous Cysts. *Skin.*

(3) Muciparous Cysts. *Mucous membrane.*

(4) Ranula. *Salivary glands.*

Until recently the term "ranula" was applied to all cysts in the floor of the mouth, and as cysts in this situation are of various kinds and arise from different structures, it naturally followed that the term gradually came to possess a topographical significance. At the present time the term should be restricted to those cysts arising in connection with the ducts of the three sets of salivary glands opening into the mouth, and should be designated as "submaxillary," "sublingual," or "parotid" ranula, according to the gland affected. If stomatologists and surgeons would adopt a uniform meaning for this term, much confusion and misunderstanding would be avoided.

In the majority of cases ranuli are probably simply retention cysts due to obstruction of a duct, and their most common occurrence in the order of frequency is as follows: In the submaxillary or Wharton's duct; in the sublingual or Rivini's duct, and in the parotid or Steno's duct; in the last-named situation, although very rare in man, they have been observed in calves, oxen, and horses. It must be remembered that all tumors situated beneath the tongue are not necessarily ranuli, for we find in that location cystic tumors of other varieties, such as muciparous cysts of the Blandin-Nuhn glands, dermoid cysts, and cystic hygromata. Lannelongue mentions congenital ranula, but Butlin thinks that they are probably "congenital cystic hygroma, or one of the cysts belonging to such a class of tumors."

In regard to the investigations of the character of the encysted fluid of ranuli, which is neither saliva nor any fluid that could be formed from saliva, we must remember that many cysts contain fluid decidedly altered in character. For example, an obstructed gall-bladder is sometimes filled with fluid that does not possess the smallest resemblance to bile. So a cyst arising in connection with a sali-

vary gland may contain fluid that scarcely furnishes the characteristic reactions of saliva.

The common origin of ranuli is the obstruction of a duct, this being the case especially with those in the floor of the mouth. They may result from operations such as amputation of the tongue, from injury to the duct or its being bound up in a cicatricial tissue. The stomatologist will often detect them through the discomfort they cause when pressed upon by a lower denture. Ranuli may become infected and ulcerated through abrasions of the mucous membrane during the first few days after the insertion of a plate. The deposition of calculi is also a frequent cause of ranula.

The cysts may be thin or thick walled, the latter being common in cases of long standing complicated with severe inflammatory phenomena. They lie in the furrow between the gum and the tongue, and bulge upward into the floor of the mouth. When large they cause a prominence in the submaxillary triangle. The duct is not always completely blocked, yet the fluid is retained, this being especially the case where it is made up of mucus and a glairy fluid like the yolk of an egg. It is reasonable to believe that ranuli sometimes arise independently of obstruction of the main duct, as in the casse of the so-called pancreatic ranuli, where observation supports the view of the existence of a pathological cause apart from the mere obstruction concerned in their production. Cysts may rupture spontaneously and recur several times during intervals of rest. All tumors of the floor of the mouth should not be regarded as ranuli, and we must especially be on the lookout for foreign substances in the ducts, as bristles from the tooth-brush, salivary calculi, straws, toothpicks, and for inflammation and sepsis of traumatic origin.

Morrant Baker has shown conclusively that ranula is not usually a dilatation of Wharton's duct, as was formerly taught, and consequently care must be exercised in examining the tumor to ascertain by pressure whether the duct is obliterated or not. In many cases the duct is not occluded and a probe can be easily passed, as noted by Bernard, Weber, Baker, Sutton, Senn and others.

To differentiate ranuli further, we have to consider the dermoid cysts which arise near the frenum of the tongue or deep in its substance. The racemose mucous glands known as Blandin-Nuhn also found in the floor of the mouth beneath the frenum linguæ are

prone to become cystic, as noted by Sonnenberg and Von Recklinghausen.

Before the occurrence of the cyst there is usually some inflammation of the mucous membrane, very often associated with affections of the teeth or neighboring structures.

MM. Tillaux and Guyon have investigated the origin of sublingual cysts. In this form of ranula the tumor always develops on the side of the buccal cavity, thrusting the tongue upward and backward, and very rarely depressing the floor of the mouth. In submaxillary ranula the growth spreads downward toward the neck. Giraldès makes a distinction between ranuli properly so called and cysts of the submaxillary gland which is of some importance as bearing upon the question of operative intervention. There are cases, however, where the dilatation of Wharton's duct may take place both in an upward direction toward the mouth, and in a downward direction toward the neck, and in these cases the line of distinction between the sublingual and the submaxillary ranula is not so well marked. Probably ranula rarely occurs as a dilatation of Wharton's duct, its origin usually being due to an obliteration and consecutive ectasis of one of the numerous conduits of the sublingual gland. Cases have been known where the production of the ranula was very acute and sudden, and even threatened asphyxiation.

Calculi occur more often in the sublingual ducts than in the submaxillary (Rokitansky). Retention cysts of Steno's duct have been seen and described by Bruns, but are exceedingly rare. So many interpretations have been given as to the origin and nature of the sublingual cysts that were formerly classified under the head of "ranula," that every case that can be carefully studied both anatomically and histologically, if carefully described, will help very much in clearing up a not very well described pathological subject. These cysts are not met with so commonly that they should be dismissed as though of no importance, for, unfortunately, if the stomatologist or surgeon feels so, the patient does not.

Pauli believed that they were formed by a dilatation of Wharton's duct and called the swelling "ptyalectasis"—or "ptyalocele" after rupture of the duct with accumulation of saliva in the connective tissue. Virchow, with good reason, objected to the latter view

of their mode of origin; he asserted that the saliva extravasated into the connective tissue would become absorbed.

Fleischman claimed that the salivary ducts could not dilate to the extent seen in cystic swellings under the tongue. He believed that these cysts are hygromata of the base of the genioglossus muscle. Gurlt and Bernard asserted that the submaxillary gland secreted a mucoid substance analogous to the contents of the cysts so frequently found on the side of the tongue. Ptyalin and rhodankalium, however, have never been discovered in the contents of a ranula. The absence of these two substances in the contents of a ranula is no proof, however, that the cyst is not a dilated duct of the salivary gland, as the cyst contents undergo chemical changes which make the secretions pathological when examined microscopically and chemically.

Bernard and Weber not only detected the orifice of the duct upon the wall of a retention cyst of Wharton's duct, but they passed a fine probe through the orifice into the cyst, and so proved the connection of the cyst with the duct. When Neumann made histological examination of part of a cyst wall and saw the ciliated epithelium he was inclined to regard the foramen cecum as the starting-point of the cyst. In some cases the foramen cecum does not terminate in a cystic sac, but follows in the direction of the median glosso-epiglottic ligament. The posterior end of this prolongation contains many mucous glands on the side of the tongue, hidden by the genioglossus muscle. We must not forget that there are growths bearing some points of resemblance to a ranula originating in obstructed muciparous glands, and also that an enlarged submaxillary bursa bears some likeness to ranuli in external appearance.

The anatomy must be borne in mind. The submaxillary gland is situated below the mandible in the anterior part of the submaxillary triangle, and is covered by integument, the platysma myoides, and the deep cervical fascia. The peculiarity of Wharton's duct of the submaxillary gland is that it commences by numerous radicles within the substance of the gland, which form a single tube of about two inches in length having walls much thinner than those of the parotid duct, and ending in a narrow orifice on the summit of a small papilla at the side of frenum linguæ. The sublingual glands, the smallest of the true salivary glands, are of about one dram in

weight, and are lodged beneath the mucous membrane of the floor of the mouth on each side of the frenum linguæ, and reach from the anterior margin of the submaxillary gland to the symphysis mentis. Their ducts, of which there are from eighteen to twenty for each gland, open into the mouth on the elevated crests of the mucous membrane caused by the projection of the glands on each side of the frenum.

An obstructed submaxillary duct, when the obstruction is at or near its margin, forms an ovoid, elastic, translucent swelling which is first noted beneath the tongue to one side of the frenum. It does not press down upon the tissues, causing the peculiar fulness to the throat below the chin from which its name ranula is derived, until it has attained considerable size. More commonly it is about the size of an almond, though it may and in some cases does increase in volume to such an extent as to constitute a danger of suffocation. When opened the fluid is clear, albuminous, of about the consistence of an egg, alkaline in reaction, and may contain phosphatic concretions. One peculiarity to be noted is that when the gland increases considerably in size so as to involve the whole of Wharton's duct, including the canals within the gland, the latter is absorbed in consequence of the pressure, and the tumor ceases to grow through atrophy. Obstructions of the sublingual duct form similar growths, which, beginning first within the mouth, in some cases press down upon the gland and then undergo atrophy. The sublingual cysts contain a fluid different from that of the submaxillary, in that it is more viscid. Both forms of growth are rare, and exceptional examples are seen in which the obstruction takes place at a point remote from the orifice and perhaps near the glands. In such cases the oval projection does not occur beneath the tongue, but early in the case is much more prominent below the chin than in the floor of the mouth, and consequently presses on the ducts.

Those tumors resulting from the obstruction of the muciparous glands are more circular, and probably never become larger or press down into the structures of the neck. They are *opaque,* because of the epithelium of which they are composed, the production of oil, and granulation within the cells consequent upon degenerative changes, making the contents as thick almost as putty, thus affording a means of differentiation from the other forms. Connective tissue growths in this region are *not translucent,* lie deeper,

and contain only serum with probably a few phosphatic or calcic concretions.

Tumors caused by enlarged bursi, which may be congenital, contain clearer serum, lie deeper than the floor of the mouth, and project less into the oral cavity and much more below the chin.

In investigating nine salivary gland cysts, all but one contained calcic formations in Wharton's duct, and only one in Steno's duct. Menocal de Cardenas has reported a congenital ranula in the newborn.

There are two forms of true ranuli; that in which the obstruction of the duct takes place at or near the orifice, as seen in the transparent sublingual growth with more or less projection below the chin, and that in which the obstruction is at or near the gland with no sublingual growth, there being merely a general uplifting of the floor and a much greater prominence of the lining below the chin.

When the obstruction is at or near the gland and the substance of the gland itself is involved in the tumor, it is best to open the sac at a point below the chin, and after a few days, when the sac has been thoroughly drained, destroy the secreting membrane by means of tincture of iodin, tents, etc. To open the sac from the mouth in such cases is an inadvisable procedure, inasmuch as there is danger of hemorrhage, and also because the long open wound is annoying to both the surgeon and the patient, and the fistulous opening is difficult to keep from becoming partially closed, the operation thus failing in obliterating both the duct and the gland.

This form of ranula is commonly confused with simple serous cysts which develop in the gland substance, or with other simple growths, in either of which instances we must destroy the secreting wall and not attempt to reestablish the canal. True excision by dissection of simple cysts is best, but because of the difficulty of establishing an accurate diagnosis incision should be resorted to rather than excision.

When well marked, translucent, and situated well within the mouth, reestablish the duct opening by a free excision of the projecting mass.

When deep-seated, involving the gland substance, open the integument, and insert a drainage.

Simple serous cysts (if diagnosis be not doubtful) should be extirpated, though it is safer to resort to incision and injections.

Obstruction of Steno's duct at its orifice results from abrasion or adhesions of mucous membrane at its orifice, and may open spontaneously.

The hard nodules which can be easily detected on the inside of the mouth may cause inflammation, adhesion, and infection of the duct walls. It is best to lay the duct open and extract the calculus from the inside of the mouth, thus preventing the formation of a salivary fistula.

Salivary fistula of the face is the usual complication of obstruction of Steno's duct from adhesions, by wounds, ulcerations, etc. Although difficult to obliterate, this can be done usually by passing a large seton, freshening the edges of the wound, and uniting them with silver sutures.

Encysted new-growths are common from obstruction of the duct of the labial, buccal, lingual, and pharyngeal glands, and the follicles of the lips and the buccal and oral membranes. The treatment is usually accomplished by simple evacuation through puncture, but in some cases probably the best treatment is by excision, curetting, and swabbing of the cyst walls.

Cysts of the tongue usually occur near the dorsum, and they require care in operating, for fatal results have followed their extirpation. Incision and injections are the best and the usual method. In treating a ranula after excising part of the cyst wall and cleaning the sac thoroughly, fill the latter with iodin, being careful not to injure the adjacent parts. Allow it to escape into the mouth, and pack the sac with lint wet with sterilized oil or unguentine, and renew the dressing daily. The use of injections of hot water is a very satisfactory adjunct to the foregoing treatment.

Recently a series of cysts came under my notice in private practice. One of them, in a lady of twenty-six years of age, was a cyst of the sublingual gland which had been diagnosed as an abscess by a local physician. As the lady declined to have it operated upon, he painted the chin and mouth with iodin and advised hot applications, and proposed an incision at a future time. I was called to attend the patient at an early hour of the morning, as she was threatened with asphyxiation; the iodin, I suppose, having stimulated the cir-

calatory activity of the affected area, causing a swelling of the floor of the mouth and tongue which extended into the throat and almost occluded the fauces. The sudden increase of the swelling is the special point of interest in this case, because of its comparative rarity. A trocar was passed through the floor of the mouth from below the chin, and the contents were drawn out with great difficulty. A drainage was left in for two days and then was opened up from the inside, and the wound healed very nicely. A sister of the same patient had at one time suffered from a submaxillary ranula.

Another case was that of a man in whom a submaxillary cyst developed on the left side following an attack of influenza, and resulted in severe tonsillitis and stomatitis, with infection of the anterior and posterior cervical glands. His wife applied poultices and then kerosene, and after causing much blistering of the neck, and severe pain, the patient sent for me. Neuralgia and deafness as well as painful deglutition and dysphagia were the principal complications. The swelling was well marked, prominent in the neck and extremely tender to the touch. The breath was foul and the temperature was 103°. After considerable cleansing with hot antiseptics and scaling of tartar I succeeded in placing the mouth in a fairly hygienic condition. I advised the patient against smoking and the use of all irritants, and tried to differentiate the swelling, which was globular and exceedingly hard. Salivary calculus seemed the most plausible cause of the disturbance, but the rapidity of appearance of the growth led me to rely on a diagnosis of abscess or ranula. After the swelling partly abated under catharsis, antisepsis, and depletion, I probed the duct, and after using gentle pressure for some time obtained a drop of greenish pus-looking material from under the tongue near the frenum. I then used a dilute solution of hydrogen dioxid, and passed the probe a little farther, when more of the thick creamy material with blood exuded. After working as long as the patient would allow me, as the swelling was very painful and he refused anesthesia in any form, I passed in a little unguentine, as well as keeping the neck dressed with it, and postponed all further treatment until the next day, when he seemed better and relieved from pain. Further gradual probing caused the instrument to pass through the duct, and when the sac was reached, by using pressure from above and below I obtained about two

drams of a copious ropy mass, and then some salivary fluid. After several days' washing out with an alkaline and saline antiseptic the growth disappeared.

I have had several cases of patients who wore plates for the first time, where the pressure obstructed both the sublingual and submaxillary glands and was a cause of grave anxiety both to their family and to myself.—*Dental Cosmos.*

RESTORATION OF GUM TISSUE ON THE LABIAL ASPECT OF TEETH. By A. W. Harlan, M.D., D.D.S., New York City. The gums are provided with a network of vessels, arterial and venous, so that repair takes place with great rapidity after an injury. This is not so strikingly apparent when they have been thinned by friction and infective processes, or by constitutional maladies, past or present. The causes of recession of the gums are well known, extraction of teeth, deposition of salivary and serumal calculus, careless use of clamps and ligatures, regulating appliances, files, disks, tweezers, tooth-brush, malposition of a tooth or two, use of sialogogues, or other remedies affecting the sockets of the teeth. Prolonged illness, defective assimilation and nutrition may also be reckoned as factors in causing recession of the gingival tissues. Some of the exanthemata, syphilis, and necrosis of alveolar margins are likewise responsible for this disfigurement.

When recession is uniform along the necks of the teeth it is generally due to the action of organisms which excrete an irritating fluid, and the gum tissue is invaded and torn down and liquefied as a result of their presence. Nothing will avail in these cases save the scraping and cutting and tearing of the whole surface of the gingival margins surrounding the tooth. The necks of these teeth should be cleaned and polished carefully, and if they are very sensitive, a 10 to 24 per cent solution of silver nitrate should be applied to each. The discoloration will soon disappear, and this agent is more effective than zinc chlorid, potassium carbonate, or copper sulfate. I have used all of the silver salts locally in such cases, but the nitrate is the most satisfactory one. None of the compounds of sodium or magnesium give any permanent relief; they are all good for temporary use only. If a profound impression on the gum tissue itself is desired, dry it, and apply a 20 per cent solution of mono- or trichloracetic acid with a camel-hair brush; after a few

minutes the patient should rinse the mouth carefully with milk of magnesia or sodium bicarbonate. In order to prevent thermal shocks take of tin oxid one-half ounce, of Spanish whiting one-quarter ounce, and of glycerin a sufficient quantity to make a paste, and with a good buffer rub and polish the necks of the teeth for from one to two hours. To do this use pieces of rubber tubing stretched over a back-sloped mandrel. It will be found very effective and agreeable to the patient.

Recession of the gum on the labial aspect of a tooth, incisors or canines, may be very disfiguring, especially in the mouth of a woman or of a man whose teeth are not hidden from view by a mustache. These cases require much care and delicate handling to effect a cure. I have spent as long as two years in restoring gum tissue over a canine or lateral incisor. In order to be successful the tooth should not have a filling on the neck, and if there is a filling of gold it should be removed and substituted by a porcelain inlay. If the glaze of the inlay is ground off, one may succeed in covering a portion of it with the gum, but at best there will be no attachment of the gum to the porcelain, although the gum may hug the neck of the tooth very closely.

In all cases where there is a recession of the gum and the neck of the tooth is free from caries, first cleanse the surface of the exposed root and carefully dissect the gum from the root to about one-quarter to three-eighths of an inch in depth, carefully wiping away the blood, keeping the mouth open until the hemorrhage ceases spontaneously or through the use of an adrenalin solution. Then make three incisions into and through the gum tissue. When the bleeding has almost ceased, fill these cuts with dried zinc iodid, allowing the blood to liquefy it so that it may be carried around the gingival margin. This will create a profound irritation of the gum, which must be left undisturbed. The patient should use for a few days some mildly antiseptic wash—an antacid one—composed of such agents as sodium bicarbonate or milk of magnesia. After the lapse of three weeks the scar tissue which will grow in these incisions will be hard enough to permit repeating the operation in a new locality. The exposed face of the root should be roughened to permit of the close adherence of the gum to this surface, as it is slowly pushed downward over the root. If great care in selecting the site of the first operation is exercised it can be repeated at least

four times, at intervals of from three to four weeks. The gingival edge of the gum may be irritated with zinc iodid, zinc sulfate or copper sulfate, at intervals of four to seven days. When it is difficult to keep up the irritation, take a silk ligature and tie two or three or more knots in it around the roots, or fasten some pure silver wire around the tooth, not quite firm, so that it will move a little and keep up the irritation. This will make the gum project downward along the exposed neck of the tooth, and over it. The gum is to be looked after carefully, and if it should become too irritated, paint it with one part adrenalin and three parts compound tincture of iodin once in three days. Use as a wash:

Hydronaphthol .....gr. xx;
Oil cassia ..... ♏x;
Oil eucalyptus ..... ♏x;
Alcohol .....ʒiij;
Distilled water .....ʒxiij. M.

Sig.—Use freely five or six times daily, diluted if necessary with more water.

The gums should not be brushed for several days after operating.

This method of treatment may be applied to the receded gums in the interproximal spaces, as well as upon the bicuspids when exposed to view. It is very important that the exposed cementum be roughened by a groover or a bur that cuts shallow grooves at right angles. A simple soluble dentifrice should be used for a time, at least, as all insoluble powders tend to collect under the free margin of the gums and prevent attachment to the denuded root.—*Dental Cosmos.*

Clinical Digests.

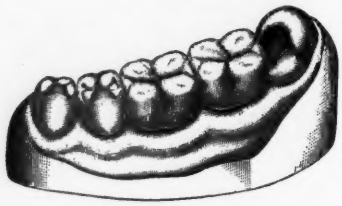
ORTHODONTIA AS APPLIED TO THE EXTRACTION OF AN IMPACTED THIRD MOLAR. By T. S. Waters, D.D.S., Baltimore, Md. I desire to call your attention to the manner in which, by availing myself of the possibilities of orthodontia, I moved a lower left third molar from its impacted position into one from which it was extracted without injury to the second molar, the tooth against which it was solidly wedged.

The partial casts shown herewith are from the mouth of a

patient thirty-three years of age. As may readily be seen in Fig. 1, the lower left third molar occupied a decidedly abnormal position.

After obtaining an impression of the left side of the lower arch, and preparing therefrom a suitable plaster cast, a crib was made

FIG. 1.



to accurately fit the first and second molars, and after cementing it upon these teeth it constituted the fulcrum or anchorage of the appliance. (Fig. 2.) The buccal side of the crib is provided with two eyelets, oval in shape, into which is fitted a threaded bar.

A nut was placed between the two eyelets, and the bar was fitted to a cavity in the tooth. By screwing the nut forward, a degree

FIG. 2.

FIG. 3.

of pressure was brought upon the tooth, which being pushed backward and upward, was eventually made to occupy a position such as enabled it to be extracted without difficulty and without injury to the second molar. (Figs. 4 and 5.) It required just twelve days from the time the appliance was inserted to move the tooth into the proper position for extraction.

This case exemplifies the possibilities of orthodontia technique as applied to the extraction of teeth, and should commend itself for adoption in all cases in which the sacrificing of the second molar is contemplated, as it makes possible the extraction of the

FIG. 4.

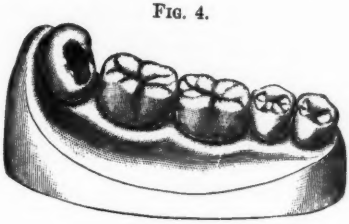


FIG. 5.

third molar without any injury whatever to its immediate neighbor.

Judgment must be exercised in all these cases, and palliative treatment given to relieve suffering which will occur if too much pressure be applied suddenly.

Treatment.—Bathe the gum daily with a saturated solution of iodin in glycerin, adding aconite and chloroform, twenty to thirty drops of each to the ounce of solution.—*Dental Cosmos.*

INFECTED THIRD MOLAR SOCKETS.—The following treatment is suggested: First of all, the use of tepid water, sterilized, or if preferred, with the addition of boric acid. After washing it thoroughly, the socket may require curettement to insure the removal of any abnormal growth resulting from the infection and the inability of the tissues to heal normally. In cases of continued pain, camphorated oil gives relief in mild cases, but if extreme, anodynes are necessary, one-eighth grain of morphin, incorporated with Balsam of Peru and iodoform (odorless), made into a paste, may be carried to the floor of the socket in a pledget of cotton, and sealed with Fletcher's carbolized resin and cotton, subsequently reducing the size of the dressing as the socket closes. In case of enlarged submaxillary and parotid glands, the use of one part tincture of opium and two parts of lead-water applied on flannel and wound with a hot cloth forms an efficient (external) application for the relief of pain.—JAS. W. WINN, *Dental Headlight.*

The Dental Digest.

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At 2231 Prairie Avenue, Chicago,

Where All Communications Should be Addressed.

Editorial.

THE OPPORTUNITIES OF TO-DAY.

By the time our readers receive this journal, 1906 will have followed its successors into the world of the past. An eventful year it has been, bringing much of disaster and sorrow into thousands of homes, but even more of joy and gladness into tens of thousands of other homes. While cyclones, hurricanes, earthquakes, railroad accidents have left hundreds to mourn their dead, and financial reverses have left others penniless, the year altogether has been one of unparalleled prosperity—which prosperity has never been surpassed in our country. It is no longer a question of "Shall we have good crops the coming season?" but where can we get the men to harvest them? The wheat can hardly find its way to the great centers of commerce. The farmer finds his granaries full almost to bursting, but is unable to land his crops in eastern and foreign markets for lack of facilities for moving. Those old mortgages which have so long worried and handicapped every member of the family have all been paid off and now the boys and girls can go to school and college. Those aching teeth can be attended to and a new order of things generally be brought about. Never has there been a time in our profession when things were "looking up" as much as at present. The people have money and are ready to spend it. Now is the time, if ever, for the young practitioner to locate, to become part of this great movement, to throw himself into his work with a vim and will that will convince the hard-headed farmers that there is something in dentistry and that possibly they had better see if they would not be more comfortable for a call upon the young dentist. The future is certainly full of promise to him who can see opportunities and possibilities. As

we send forth the last number of the DIGEST for 1906 it is with the determination of making the next year's issue the best yet published. Several new features will be introduced and our motto will be in reference to the journal, "NONE BETTER."

Notices.

THE BUTTE (MONT.) DENTAL ASSOCIATION.

The Butte Dental Association held its election of officers Nov. 12, 1906, with the following results: President, Dr. Keenan; Vice-President, Dr. Sandberg; Secretary, Dr. Belk; Treasurer, Dr. Keyser; Member of Board of Directors, Dr. Lowry.

SPARTANBURG (S. C.) DENTAL SOCIETY.

The Spartanburg dentists met Nov. 25, 1906, and organized a district society. The following officers were elected for the ensuing year: President, A. H. Fleming; Vice-President, J. T. Montgomery; Secretary and Treasurer, F. C. St. John.

WINNEBAGO (ILL.) ODONTOLOGICAL SOCIETY.

At the annual banquet of the Winnebago Odontological Society, Nov. 16, 1906, the following officers were elected: President, M. R. Harned; Vice-President, B. H. Bigelow; Secretary and Treasurer, J. F. Stokes; Board of Censors, P. H. Plumber, chairman.

SOUTHERN NEBRASKA DENTAL SOCIETY.

The second meeting of the Southern Nebraska Dental Society was held in Superior, November 13-14, 1906, in Dr. Frank Nelson's office. Good attendance and a fine spirit. Several good clinics and some fine papers by Dr. J. M. Prince of Oxford, Dr. N. H. Morrison and Dr. E. A. Thomas of Red Cloud. Next meeting will be held in Superior in January.

W. A. MCHENRY, Secretary, Nelson, Nebraska.

OHIO STATE DENTAL SOCIETY.

At the forty-first annual meeting of the Ohio State Dental Society held in Columbus, December 4, 5 and 6, 1906, the following officers were elected: President, H. C. Brown, Columbus; First Vice-President, C. I. Keely, Hamilton; Second Vice-President, W. H. Whitslar, Cleveland; Secretary, F. R. Chapman, Columbus; Treasurer, Weston A. Price, Cleveland; Directors for three years, W. H. Todd, Columbus; A. O. Ross, Columbus; W. A. Barber, Springfield and H. T. Smith, Cincinnati.

F. R. CHAPMAN, Secretary, Columbus, O.

NORTHEAST MISSOURI DENTAL SOCIETY.

At the meeting of the Northeast Missouri Dental Society held in Macon, Nov. 13, 1906, the following officers were elected: President, J. L. Bridgeford, Macon; Vice-President, H. R. Neeper, Hannibal; Secretary-Treasurer, Edward S. Brown, Edina. The next meeting will be held at Kirksville.

BOARD OF DENTAL EXAMINERS FOR THE DISTRICT OF COLUMBIA.

The Board of Dental Examiners of the District of Columbia will conduct the semi-annual examination at the Dental Department of Georgetown University, Wednesday, Thursday, Friday, January 2, 3 and 4, 1907. All applications must be accompanied by a fee of $10.

For further information address,

WILLIAM B. DALY, Secretary,
1311 R. Island Ave., N. W., Washington, D. C.

TRI-CITY DENTAL SOCIETY.

At the Tri-City Dental Society meeting held in Council Bluffs, Ia., Nov. 27, 1906, the following officers were elected: President, E. H. Bruening, Omaha; Vice-President, L. G. Van Slade, South Omaha; Secretary, F. E. King, Omaha; Corresponding Secretary, J. W. Wallace; Treasurer, Scott Covalt, Council Bluffs; Members of Board of Censors, Drs. Barber, Cox and C. E. Woodbury.

CENTRAL MISSOURI DENTAL ASSOCIATION.

At the third annual meeting of the Central Missouri Dental Association, held at Sedalia, Nov. 21, 1906, the following officers were elected for the ensuing year: President, O. C. McCullom, Clinton; First Vice-President, P. H. Brame, Windsor; Second Vice-President, H. L. Mosier, New Franklin; Corresponding Secretary, C. E. Fletcher, Sedalia; Recording Secretary, N. U. Howard, Sedalia.

RESOLUTIONS ON THE DEATH OF DR. C. R. TAYLOR.

Whereas: On roll call at the opening session of the Nov. 1906, meeting of the Illinois State Board of Dental Examiners, the name of Charles R. Taylor receiving no answering response, makes us pause to pay tribute to his worth and memory. Little did we think at our last parting that at our next meeting our long-time friend and colaborer, strong in all the elements that constitute a lovable man, would be beyond the reach of voice, and his chair stand vacant at our table, reminding us that the strongest ties of friendship must sooner or later be broken, but not forgotten. In token of our affection and appreciation of Doctor Taylor's influence in private and public life for the betterment of all who had the good fortune to know him, it is

Resolved, that a page of our records be set apart, and the sentiments herein expressed be inscribed thereon.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

SOUTH DAKOTA STATE BOARD OF DENTAL EXAMINERS.

The next examination of the South Dakota State Board of Dental Examiners will be held at Sioux Falls, Jan. 29, 30, 31, 1907, beginning at 1:30 p. m. All candidates for examination must bring diploma from reputable dental college or affidavit of having been engaged in the practice of dentistry for at least three years immediately preceding said examination. Instruments and materials necessary to do all kinds of operative and prosthetic work will be needed at this examination. Vulcanizer and lathes will be furnished by the Board. All applications must positively be in the hands of the secretary by Jan. 22.

G. W. COLLINS, Secretary,
Vermillion, S. D.

G. V. BLACK DENTAL CLUB OF ST. PAUL.

The members and friends of the G. V. Black Dental Club of St. Paul (Inc.) will hold their annual Midwinter Clinic in Feb., 1907.

The program is now being arranged by the Clinic Committee. The Operative Clinic will be on its usual high order. There will be a number of progressive clinics on both days of the meeting. Several of the best known men in the dental profession will read essays.

The table clinics will be the most interesting and instructive which we are able to obtain. The program and dates on which the meeting will be held will shortly be published.

Special rates on all railroads.

For any further information apply to,

DR. R. B. WILSON, Secretary,
107 E. Sixth St., St. Paul, Minn.

BANQUET TO DR. G. V. BLACK.

The Fraternal Dental Society and the St. Louis Society of Dental Science will unite in giving a banquet in honor of Dr. G. V. Black, at the Jefferson Hotel, St. Louis, the evening of Jan. 15, 1907. The afternoon of the same day Dr. Black will deliver an illustrated lecture on some phase of Operative Dentistry.

The long and untiring efforts and valuable scientific contributions of Dr. Black easily make him the foremost dental scientist the world has ever produced. No dentist living or dead so much deserves the thanks and praise of his professional associates. A most cordial invitation is extended to the members of the profession to be present at both lecture and banquet and assist in honoring Dr. Black. Those desiring covers reserved for banquet will remit $5, price per plate, to Dr. Richard Summa, Secretary, Oriel Bldg., St. Louis, Mo., before Jan. 12, 1907.

Committee: Geo. A. Bowman, Chairman; A. H. Fuller, Edward H. Angle, D. O. M. Lecron, Adam Flickinger, Wm. Conrad, Burton Lee Thorpe.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the Wisconsin State Board of Dental Examiners for examinations of candidates for license to practice dentistry in Wisconsin will be held on Monday, Jan. 28, 1907, at the Hotel Pfister, Milwaukee, Wis.

Application must be made to the secretary fifteen days before examination. The candidate must be a graduate of a reputable dental college, or have been engaged in the reputable practice of dentistry for four consecutive years, or an apprentice to a reputable dentist for five years.

For further particulars apply to

J. J. WRIGHT, Secretary,
1218 Wells Bldg., Milwaukee, Wis.

CHAMPAIGN-DANVILLE (ILL.) DISTRICT DENTAL ASSOCIATION.

At the meeting of the Champaign-Danville District Dental Association held at St. Joseph, Nov. 13, 1906, the following officers were elected: President, Dr. Johnson, Danville; Vice-President, F. M. Conkey, Homer; Secretary, E. M. Bush, Rossville; Treasurer, C. P. Howard, Champaign; Membership Committee, J. D. Wilson, Danville, C. C. Van Scoyoc, J. O. Schoonmaker, Urbana, E. S. Button, Paxton, P. W. Miller, Hoopeston, C. O. Darmer, Tolono and F. M. Conkey; Censors, Dr. Rideout, Danville, H. E. Davis, St. Joseph and Dr. Keil of Monticello; Program Committee, George C. McCann, Robt. Wallis, Dr. Warner of Urbana. The next session will be held in Urbana early in Feb. 1907.

CHICAGO COLLEGE OF DENTAL SURGERY ALUMNI ASSOCIATION.

On Jan. 16 and 17, 1907, the Alumni Association of the Chicago College of Dental Surgery will celebrate the twenty-fifth anniversary of the establishment of the college by holding a grand reunion and clinic. Arrangements have been made for a number of papers, a very extensive clinic, a theater party, and a banquet. A railroad rate of a fare and a third for the round trip from all points in the United States and Canada on the certificate plan has been arranged.

A cordial invitation is extended to the general profession to be present, as well as all members of the Alumni Association and all graduates of the college.

R. C. BROPHY,
J. P. BUCKLEY,
Committee on Publicity.

LATEST DENTAL PATENTS.

831,943. Dental handpiece, Chester M. Freeman, Brookline, Mass.

831,960. Artificial denture, Philip B. Lesemann, Nashville, and S. J. Lesemann, Altamont, Ill.

832,528. Removable dental bridgework, Ernest C. Bennett, New York.

832,587. Artificial tooth, Robert Brewster, Chicago, Ill.
832,790. Machine for beating leaf metal, Jakob Heinrich, and H. Dorsch, Furth, Germany.
832,955. Dental plugger, Henry D. Bultman, New York, N. Y.
832,975. Toothbrush holder, Eli J. Hyde, Spokane, Wash.
833,044. Dental instrument, Thomas Goodhugh, Sutton, London, England.
833,204. Dental bite-taker, Lyter H. Crawford, New York, N. Y.
833,254. Dental crown construction, Carl A. Skalstad, Chicago, Ill.
833,375. Dental instrument for slitting and removing cap-crowns, Leo Dollar, Philadelphia, Pa.

News Summary.

OTHELLO KERR, a dentist of Independence, Mo., died Nov. 18, 1906, from typhoid fever.

ROBERT A. HOLLIDAY, 56 years old, a dentist of Atlanta, Ga., died Nov. 9, 1906, after a long illness.

H. W. SHRIVER, 55 years old, a dentist of Omaha, Neb., died Nov. 20, 1906, from a stroke of apoplexy.

JAMES ROGERS, 71 years old, a dentist of New York and Chicago, died in the latter place Nov. 16, 1906.

J. H. WHITE, a dentist of Charleston, Mo., was killed while on a hunting expedition, Nov. 20, 1906.

U. D. BILLMEYER, 51 years old, a dentist of Chattanooga, Tenn., died at Asheville, N. C., Nov. 24, 1906.

W. J. ADAMS, a dentist of Knoxville, Ill., died Nov. 22, 1906, after thirty-five years of practice in that city.

R. PAUL JONES, a dentist of Scottsboro, Ala., died Nov. 10, 1906, of pneumonia. He was ill only a few days.

MRS. MARY BELL FINLEY, wife of Dr. M. F. Finley of Washington, D. C., died Nov. 11, after a painful illness.

FRANCIS DAVID NELLIS, 71 years old, a dentist of Syracuse, N. Y., died Nov. 29, 1906, after an illness of six weeks.

JOHN D. HAMMOND, 72 years of age, a dentist of Monongahela, Pa., died Nov. 26, 1906, as the result of injuries received in a fall a week previous.

JOHN SEIBERT BOAK, 67 years of age, and a native of Berkely County, W. Va., and for many years a leading dentist of Martinsburg, died at his home, Oct. 4, of paralysis, following an illness of several months.

A GUIDE IN PUNCHING HOLES IN BACKINGS.—To accurately punch holes in backings, take a small piece of paper and slip over the pins of the facing, trimming to the size you wish the backing to be. Remove this pattern and place on plate, punching to correspond with the holes in the paper.—R. L. HESSER, *Dental Summary.*

ACCIDENT.—The laboratory of Dr. C. A. Vinal of Lynn, Mass., was wrecked by the explosion of a vulcanizer in his rooms Nov. 30.

DAMAGE SUIT.—A man in Everett, Wash., is suing two local dentists for $1,000 damages for alleged facial mutilation and for being kept under chloroform for five hours.

SENTIMENTAL.—Stella—"I wonder why sentiment attaches to a first kiss?" "Bella—"It's like the first tooth; you've got to have it before you get the second."—*Brooklyn Life.*

PREVENTION OF SCARS.—The London physician's discovery that scars may be prevented or removed by cutting the skin slantwise instead of vertically is pronounced one of the most important of recent advances in surgery.

TO HOLD COTTON ON SMOOTH BROACH.—In order to hold cotton on a smooth broach, rub a little wax on the broach, warm slightly, and wrap on the desired amount of cotton.—H. L. ENTRIKEN, *Western Dental Journal.*

TO KEEP HYPODERMIC NEEDLES FROM RUSTING.—Simply dry the needle out with blasts of hot air from the chip blower. Throw away the little wires and you will be surprised how long your needle will last.—*Dental Review.*

TWISTING LIGATURES.—Wire ligatures should first be drawn tightly with the hands and then twisted. If the attempt is made to tighten by twisting only, the wire will break before any tension to speak of is attained.—*Western Dental Journal.*

TR. LAVENDER COMP., U. S. P.—Tr. Lavender Comp., U. S. P., costs sixty cents per pound and may be diluted to make a gallon or more. A few drops of the diluted solution in your cuspidor will have pleasant effect on your patients.—H. E. DAVIS, *Dental Review.*

THYMOL IN THE TREATMENT OF ABSCESSES.—Thymol is very unsoluble under ordinary circumstances, but it dissolves in oil of eucalyptus, when it becomes a valuable agent in the treatment, especially of the mild forms, of chronic blind abscesses.—GEO. W. COOK, *Western Dental Journal.*

EXAMINING BOARD AFFAIRS.—At the recent examination held by the Connecticut State Board, eleven applicants were granted licenses to practice dentistry.—The Governor of Tennessee, Nov, 17, reappointed W. H. Jones of Nashville and Southall Dickson of Bolivar members of the State Board.

PAINLESS APPLICATION OF CORROSIVE SUBLIMATE.—L. F. Appleman (*American Medicine*) states that when solutions of mercury bichlorid are made with normal salt solution instead of water, they do not cause the slightest pain when applied to the mucous membranes.—*Denver Medical Times.*

PROTECTING PORCELAIN SURFACES FOR SOLDER WORK.—If porcelain surfaces in bridgework are coated with sandarac varnish before investing, and care is taken to have the investment thoroughly heated before beginning soldering, it will result in little or no cracking or checking of the porcelain.—*Dental Review.*

THE CLOSING OF A DENTAL COLLEGE.—Owing to the closing of the Des Moines College of Dental Surgery, thirty-six dental students will leave Des Moines to enter the Creighton Dental School at Omaha. The party composes the larger part of the students of the school, but three or four of them going to the State University.—*Des Moines News* (*Dental Brief*).

FATALITIES.—A young woman of Denver, Colo., died Nov. 24 from the effects of cocain and aromatic spirits of ammonia administered to her by a dentist.—Nov. 28 a man in Newcastle, Pa., died from hemorrhage after having a tooth extracted by a dentist.—As a result of heart failure from nervous shock, a ten-year-old child of Pottstown, Pa., died in a dental chair.

MAKING DIES.—In cases where it is impossible to secure a plaster of Paris impression a die can be obtained from modeling compound by using the following die metal: Bismuth, 48 per cent.; cadmium, 13 per cent.; lead, 19 per cent.; tin, 20 per cent. This can also be poured into wet plaster of Paris with little or no risk.—O. H. SIMPSON, *Dentist's Magazine.*

WAS HE INNOCENT?—"Got the job o' business cards done fur Doc Piller?" asked the country editor. "Ya'as," replied his foreman, "it's done, but Hi made a leetle mistake a-settin' it up. Mebbe Doc'll kick, but I reckon it ain't so fur wrong." "What is it?" "Hi made it 'Prescriptions Carefully Confounded.'"—*Philadelphia Press.*

SETTING INLAYS.—When the cavity extends below the gum margin, as the rubber dam is not necessary, it is best to place a piece of cotton saturated with adrenalin well down between the teeth and against the gums, allowing it to remain several minutes. This not only prevents the gums from bleeding or marking, but causes the tissues to shrink temporarily.—THOS. P. HINMAN, *Items of Interest.*

CLASPS IN REMOVABLE BRIDGEWORK.—The clasp should be as wide as possible not to interfere with the occlusion or impinge upon the gum, as the narrower the clasp is, the closer it hugs the tooth; and the closer it fits, the more mechanical abrasion it causes; and the more abrasion, the more injury it does. The clasp should be sustained by frictional contact at a few points only.—H. J. GOSLEE, *Items of Interest.*

ILLEGAL PRACTITIONER.—Nov. 13 a man in Los Angeles, Cal., was fined $50 for practising dentistry without a license. He pleaded guilty.

The wife of the manager of a dental parlor in Boston undertook to extract a tooth for a patient in the dentist's absence, but made such a mess of it that she was arrested for practicing dentistry without a license. On pleading guilty her case was put on file.

VULCANIZING RUBBER.—I believe that the majority of rubber dentures are vulcanized at too high a temperature and in too short a time. A denture should be vulcanized at 280° or 290°—depending upon the rubber—for three hours after the vulcanizer has reached that point. In that time a thick lower denture can be vulcanized solid; you can saw right through the mass and polish the cut surface, but you cannot do that if vulcanized at 320° for 55 minutes approximately.—DR. GRITMAN, *Dental Cosmos.*

THE RUBBER DAM.—New rubber dams should be thoroughly washed with soap and water; or, better still, boiled before using. Any one who has not practiced this will be astonished at the amount of impurity removed in this process; it certainly offends against the canon of good taste to allow the patient to suck this off, though there may be no question of any specific disease germ.—J. H. BADCOCK, *British Dental Journal.*

DENTAL ETHICS.—Training in ethics must begin in the kindergarten and primary school; it must have the continuous influence of the home in its development, and must be continued throughout the preparatory period. Lacking this background the giving of a few lectures upon dental ethics is time wasted. No student can understand dental ethics if he has no ethical sense to which to appeal.—E. C. KIRK, *Dental Cosmos.*

ACUTE INFLAMMATION OF THE PERIDENTAL MEMBRANE.—Being assured that the apex of the root is open, or filled only with moisture, in all cases, even before the formation of pus, place in the pulp chamber a piece of solidified formaldehyd the size of a pin head and seal in; relief will come immediately or within a few hours, all causes of congestion being completely killed.—F. B. LAWRENCE, *Western Dental Journal.*

INDICATIONS FOR A PORCELAIN BRIDGE.—The indications for a porcelain bridge should be plenty of space for porcelain to get the required strength to withstand the force of mastication, as we are entirely dependent upon its bulk for its strength. We must also consider the condition of the teeth to serve as abutments, their number and situation, the curve of the arch and, most important, the length of bite.—D. O. M. LE CRON, *Dentists' Magazine.*

SILVER NITRATE.—For ten years I have made it a rule to see that all the teeth back of the canines were given a good treatment with a saturated solution of silver nitrate as soon as possible after eruption. I apply it with a small swab, letting it stay a minute and pushing it with an explorer down into the sulci. The staining is only superficial and caries is generally prevented, and if it occurs it is greatly retarded.—H. F. HAMILTON, *International Dental Journal.*

REMOVING GLAZE FROM CARBORUNDUM STONES.—To renew carborundum stones that have become glazed from grinding down teeth containing amalgam fillings, place them in a beaker and cover with a 50 per cent. solution of nitric acid, allowing them to remain for two or three hours. Remove and place in a strong solution of sodium bicarbonate for several hours that the acid which has been absorbed by the stones may be neutralized.—W. H. TWEEDLE, *Dental Review.*

PULP ANESTHESIA.—Prepare the cavity as usual. Place a pledget of cotton saturated with cocain directly over the pulp, and fill the remainder of the cavity with a piece of vulcanite. Fit in the cavity, as prepared, a short piece of orangewood and direct the patient to bite down on this with increasing force. In this way is obtained a well-directed regular pressure with less discomfort to the patient and operator than with the pressure syringe.—E. T. LOEFFLER, *Dental Summary.*

UPPER PROTRUSION OF DECIDUOUS TEETH.—It is not often that we see a case of marked uppper protrusion of the deciduous teeth; yet I have seen several such cases where there was no history of thumb-sucking, enlarged tonsils, or other mechanical cause, but where upper protrusion of the permanent incisors was present in quite a large number of the children's relatives, justifying the conclusion that these cases were inherited rather than acquired.—WM. MATTHEWS, *Dental Record.*

CUTTING UP SOLDER.—Solder should be used in as large pieces as can be put on the work. One or two pieces the right size for a crown will give better results than twenty small pieces. The reason for this is that oxide on a large piece is much less in proportion to bulk than the skin on a small piece and the weight of the large piece will break the skin easier. Again less borax is necessary, and the least borax used the better, provided you use enough.—C. C. ALLEN, *Western Dental Journal.*

ALWAYS MAKE A CHARGE FOR TREATMENTS.—A mistake frequently made by dentists is in not demanding proper compensation for the hours of work they spend in treating patients' teeth. It is more of an expenditure of energy to destroy a pulp, or to clean out a tooth that has a dead pulp in it, and place it in an aseptic condition and properly fill the canals than to put in any filling. The dentists of our state and of our country are spending much of their energy in doing this kind of work, in advising patients, and getting practically nothing for it.—TRUMAN W. BROPHY, *Dental Review.*

SENSITIVE DENTIN.—In the treatment of sensitive dentin the ethyl chlorid spray gives very gratifying results if properly managed. It is by no means painless in its application, but is appreciably less so if a blast of cold air is first directed against the tooth, making the change of temperature less sudden. A pledget of cotton saturated with the liquid should then be gently brought into contact with the tooth or cavity and then removed, repeating it frequently, until it can be left in the tooth without excessive pain, when the tooth may be sprayed direct. The finer the spray, the better.—GEO. GOW, *Dominion Dental Journal.*

HEMOSTATIC MIXTURE.—*Pharmaceutische Zeitung* recommends the following hemostatic mixture:

℞—Sulfo-phenic acid,		℥jss;
Rectified alcohol,		
Benzoic acid,		℥j;
Tannic acid,		℥j;
Glycerin,		℥jss;
Rose-water,		℥vij. M.

The sulfo-phenic acid is prepared by mixing one part of sulfuric acid with one-half part of carbolic acid and heating for several minutes in a bain-marie or water-bath. The benzoic acid is dissolved in a portion of the alcohol and the glycerin, and the tannic acid in the remainder of the alcohol. The mixture is clear, of a straw-color, acid in taste, caustic, but not irritating, and coagulates albumin.—*Dental Cosmos.*

FIRE.—Dr. Clark of Sheffield, Ala., suffered the loss of his dental instruments, office fixtures, etc., Nov. 14, with no insurance.

PYORRHEA ALVEOLARIS TREATED WITH COMMON SALT.—In a case which had resisted treatment for a great many years, after the loss of many teeth, a cure was effected through the use of common salt worked down into the pockets several times a day, salt being also used on the tooth-brush. The gums became solid and healthy and recession stopped. The loose teeth became so firm that they were used as supports for a bridge.—E. H. ALLEN, *Dental Review.*

FIRST AID FOR WOUNDS.—The result of observation during the recent Russo-Japanese War shows that the application of a simple viscid resinous solution to the wounded area without any washing or other antiseptic precaution, followed by the wrapping of the parts in aseptic cotton, is most efficacious in preserving the wound in an aseptic condition. This resinous solution is composed of one heaped tablespoonful of mastic, three tablespoonfuls of chloroform and twenty drops of linseed oil. Chloroform is preferable to spirit as a solvent, and is generally at hand. Castor oil may be substituted for linseed oil, but the latter is better.—*British Dental Journal.*

RETIREMENT OF DR. W. S. HOW.—Dr. W. Storer How, one of the best known dentists in the United States, for many years located in Philadelphia, has just retired from active practice. Dr. How first began the study of dentistry in 1851, under Dr. Benjamin Lord, of New York City, and graduated in 1854 from the Philadelphia College of Dental Surgery. After graduating he went to Cincinnati, where he practiced until March 31, 1883, when he left that city and located in Philadelphia, where he practiced until the present time, thus rounding out more than fifty years of continuous service in the field of American dentistry.

A WILLING WITNESS.—To prove that the dentist who had sued for the amount of his bill was unskilled in his art, the cross-examiner asked: "You made Mrs. Blank a set of teeth?" "Yes, sir." "And a little later you made her another?" "Yes, sir." "What became of the first set?" "She's wearing it." "And the second?" "She's wearing that, too."

"Do you mean, sir, to tell us that she's wearing both sets at one and the same time?" "Yes, sir." "Then, perhaps you can explain to the satisfaction of the jury how the lady in question performs this seemingly miraculous feat?" "I think I can." "Go ahead." "One is an upper set; the other, a lower."—*D. O. and L.*

TO KEEP A HYPODERMIC SYRINGE IN GOOD ORDER AND THE NEEDLE FROM CORRODING.—There are several methods, but the one most efficacious is as follows: Pour a solution of 90 parts glycerin and 10 parts carbolic acid into a four-ounce wide-necked bottle. Place just sufficient of the solution in the bottle to cover the whole of the needle when the two flanges of the syringe are resting over the top of the bottle, and the barrel of the syringe suspended in the center of the bottle. This preparation prevents the needle from rusting or corroding, keeps the leather of the plunger moist and air-tight, and acts as a good antiseptic.—M., *Federal Dental Journal.*

PATIENTS OF LIMITED MEANS.—When the circumstances prohibit porcelain inlays and gold bridgework, there are ways of giving a sound, healthy, serviceable dental armature with amalgam fillings and vulcanite or alloy plates. When much time and big fees are impossible, the good dentist will study how he can do the very best for the patient under the circumstances.—DOUGLAS GABELL, *British Journal Dental Science.*

DEVITALIZING PULPS.—Arsenic, if properly sealed in a cavity and left long enough, is much more satisfactory than pressure anesthesia to both the patient and operator, unless the case be one of emergency, and then no doubt pressure anesthesia is the method to use. We were taught in college to leave arsenic in a tooth from twenty-four to thirty-six hours only. I am quite convinced that this limited time given the arsenic to do its work is the reason so many young practitioners are sorely tried by having patients return too soon, and upon opening into a tooth, find the pulp still vital or partially so.—W. E. O'KEEFE, *Dental Review.*

ROBBERIES.—Drs. Turner and Hyler of Savannah, Ill., Nov. 28, $150 in gold, silver and platinum and $50 in gold, respectively. C. B. Hess, Atlantic, Ia., Nov. 17, $35 in gold and instruments.—Dr. Dingwell, Clinton, Ia., Nov. 29, $40 in gold.—Drs. J. H. Dwight and B. E. Oberman, Des Moines, Ia., Nov. 17, $100 in scrap gold and $50 in gold, respectively. Evidently the same artist worked in both places, as nothing else was touched and the entry was made by skeleton keys in each case.—Drs. B. E. Nelson and C. G. Nichols, Leavenworth, Kan., Nov. 19, $12 and $350 respectively.—Dr. Minnich, Springfield, O., gold valued at $75, Nov. 17. C. C. Beebe, Racine, Wis., Nov. 26, $80.

METHOD OF INSERTING CRYSTAL GOLD.—How many dentists in using crystal gold have taken advantage of the ease of adaptability of some of these forms of crystal gold to a cavity by using them in connection with foil or heavy gold, placing a mass of crystal gold relatively in position, and over it a mat of foil or plate of rolled gold to facilitate the carrying of the crystal accurately to place *en masse* without the chopping up that is apt to occur with any form of crystal gold? It seems to me there is a saving of time and gold, and facilitating of the packing, by using alternate layers of crystal gold and foil in some form, combining in this way the virtues of foil and crystal.—W. B. V. AMES, *Dental Review.*

TEMPORARY REPAIR OF VULCANIZER PACKING.—Frequently it will happen that the packing of the vulcanizer becomes leaky and that it is impossible to procure a new one at the very moment of need. A temporary repair may be quickly accomplished in the following way: With a sharp knife cut out the leaky packing at right angles clear through to the lid, shape a piece of soft pine wood to fit the space, leaving it a little fuller at the upper margin. Remove the thermometer, and then screw the lid tightly to place. A few sharp blows with a wooden mallet will quickly drive the lid home, and this will wedge the pine snugly into position. Now remove lid, readjust the thermometer, and the vulcanizer is ready for use.—G. W. MUSGRAVE, *Dental Era.*

ACONITE AND CHLOROFORM.—Dr. Louis Jack says that after capping a pulp there is sometimes a tendency to pain in the immediate region, which is also often reflected to the ear, and a decided reaction to cold applications. In such cases, dry the gum tissue and rub away adhering mucus and apply on a pledget of cotton, for from fifteen to twenty seconds, a lotion made of one part chloroform and two parts of aconite. The action of the chloroform is to accelerate the absorption of the aconite, which depresses the sensory nerves and equalizes the blood pressure at the apical region. The chloroform also acts as a counter-irritant primarily with a secondary sedative reaction. Such applications have an endurance of several hours, or in some cases for one or two days.—*Dental Review.*

MARRIAGES.—Owen Hayes, a dentist of Sherrard, Ill., was married to Miss Edith May Wilmerton of Moline Nov. 14.—Geo. E. Hourn, a dentist of Lanesboro, Minn., was married to Miss Pauline Kellersman of St. Louis, Oct. 31.—T. M. McGuire, a dentist of East Liverpool, O., was married to Miss Ethel M. Hall, also of East Liverpool, Nov. 28.—Frank H. Newton, a dentist of Atchison, Kan., was married to Mrs. Bertha Harrison of Kansas City, Nov. 10.—R. H. Sanderson, a dentist of Martin's Ferry, Va.—Allen White, a dentist of New Haven, Conn., was married to Miss Bessie May Roberts of New Haven, Nov. 21.—Dr. Archibald Bennet Patterson, a dentist of Buffalo, N. Y., was married December 26th to Miss Jessie Leona Wing.—Dr. John Durbin Thomas, a dentist of Los Angeles, Cal., was married October 2d to Mrs. Elsie L. Passmore Hamrick.

METHOD OF MAKING SOLUTIONS OF COCAIN AND EUCAIN.—The success with these solutions depends upon (1) pure drugs, (2) pure water, (3) fine sharp needles, and (4) thorough injecting. These conditions complied with, an absolutely painless operation can be performed. Have your druggist weigh the cocain out in 1-grain papers and the eucain in 2 or 3-grain papers, and keep these in an absolutely clean place and always on hand. Boil the water thoroughly and filter it into a clean bottle; when making a fresh solution, measure out 100 m. in your graduate, and into this put the contents of one paper; if cocain, you will have a 1 per cent. solution; if eucain, you have a 2 or 3 per cent. solution, according to the number of grains in a paper. Eucain must be boiled to get a clear solution, while cocain is spoiled by boiling.—W. E. TENNANT, *Dental Review.*

A TOOTH-POWDER.—The author recommends the following formula in a recent issue of *L'Union Pharmaceutique*:

℞—Menthol,	gr. vij;
Salol,	ʒij;
Castile soap,	ʒv;
Calcium carbonate,	ʒv;
Magnesium carbonate,	ʒi;
Oil of peppermint,	gr. xv. M.

Sig.—If salivary calculi be present in large quantities there should be added to the formula from two to five drams of powdered pumice-stone.—DR. HUGENSCHMIDT, (*Revue Internationale de Prothèse Dentaire,* Paris,) *Dental Cosmos.*

CEMENT LININGS WITH AMALGAM FILLINGS.—There are many cases where a lining of cement is desirable when amalgam is to follow, and especially where the loss of dentin leaves a section of translucent enamel, which would show blue with the amalgam immediately in contact. One very satisfactory way to proceed is to cover the cavity walls with cement, and then having amalgam mixed and ready, crowd it in in a way to force out the surplus cement, finally clearing the margins of cement, so that the finished filling shows no line of cement exposed. This might not inaptly be called an amalgam inlay, and would not be a bad idea to apply in nearly all cases where amalgam is to be used. If painstakingly done, the method is ideal. It should be done with some rapidity to be able to force out surplus cement, and especially at obscure margins before crystallization begins.—R. B. TULLER, *Amer. Dental Journal.*

FOR SENSITIVE CAVITIES.—There was a discussion at the August meeting of the American Dental Society of Europe on this subject, in which Dr. Bogue, of New York, told us he used pure carbolic acid first in the cavity and afterward chlorid of zinc. I have been experimenting for some months with peroxid of sodium, and now having used Dr. Bogue's hint about using carbolic acid first, I find I can control very troublesome cases with not too much previous pain. For three or four years I have used very finely powdered peroxid of sodium for relieving sensitive places on the necks of teeth, or spots rendered sensitive by contact with gold bands supporting plates. This led me to use it occasionally for troublesome cavities. My present method is: Flood the cavity with pure carbolic acid and wait a minute or so; then put into the cavity a little finely powdered peroxid of sodium without wiping out the acid. This causes some pain. Add a few more grains and commence to carefully excavate. If the rubber dam is not used care must be taken of the gum.—HENRY I. MOORE, FRANKFORT, GERMANY, *Dental Review.*

EASY METHOD OF BACKING.—One of the most important items in crown and bridge work is that your backing fit the tooth perfectly, especially in the case of porcelain-faced crowns. How many of us have spent a quarter of an hour in burnishing a backing, and then found that it was far from being a fit? By a very simple device I have found that both time and patience can be saved.

Having ground the tooth at the back to the desired shape—which is invariably oval—take your Melotte's moldine and tray, dust the tooth with French chalk, and press it firmly into the moldine; draw away the tooth, and you will have an impress of tooth with the pinholes left by the pins. Take two pieces of steel, iron, or copper wires of about the same gauge as the platinum pins, and insert them into the holes left by the pins of the tooth; pour the fusible metal; when set, draw away the die and you have a tooth-back with pins in position. Dust with French chalk and take the counter-die. You can now strike up the backing with no fear of breaking the tooth. By this method—which does not take more than three minutes—you secure a perfect backing, and it will only take one-third the time that it takes to bend up and burnish.—W. B. R., *Elliott's Quarterly.*

DRAINAGE OF ABSCESSES.—There is no place in the human body where care in securing beyond question the complete drainage of abscesses is so important as in the mucous tissues of the mouth. The blood supply is so rich in this region that cuts close in a surprisingly short time and the formation of pus is often profuse and rapid. Hence we must insist upon the necessity of keeping up the drainage for a sufficient time for the complete cleaning of the abscess. In all cases of the drainage of abscesses in the membranes of the mouth I insist on the use of 95 per cent. carbolic acid in the tent. A very small amount retained in the gauze or cotton is sufficient to cauterize the lips of the incision, making the opening freer, promoting the egress of pus and presenting a barrier to the ingress of new infective material.—G. V. BLACK, *Northwestern Dental Journal.*

PATENT MEDICINE TRAFFIC IN GREAT BRITAIN.—Figures were recently published by *The Lancet,* showing the amount of duty paid on patent medicines during one year in Great Britain, and the consideration of these in conjunction with the number of packages represented and their face value affords interesting reading.

The total number of packages was 39,861,146, ranging in price from 27 cents to $8.25 each. The total face value of these amounted to £2,764,557 (approximately $13,463,392).

Further, we quote the *Lancet* regarding this subject and the showing made.

"The sale of patent medicines for the year under consideration averaged, therefore, more than one package for each inhabitant of this country. This nefarious traffic will go on increasing so long as the majority of newspaper proprietors are untrammeled by legal restrictions and unfettered by principles. It is the unscrupulous newspaper proprietor who acts as the middleman, enabling the quack, by misrepresentation, and often by unmitigated fraud, to take advantage of the ignorance and prejudice of the public."

HYDRONAPHTHOL IN DENTAL OPERATIONS.—I have from time to time noticed, in the cleaning out of a cavity preparatory to filling, that we come across, over the pulp-chamber, a layer of softened dentin, which if removed would necessitate the treatment, and probably the removal, of the pulp. I find that by using in equal quantities hydronaphthol and cement (in the ordinary way of mixing cement for a filling), and placing a capping of the same over the layer of dentin, then allowing it to become set and proceeding with my filling in the usual manner, my patient has no further trouble. The hydronaphthol preserves the teeth by arresting the action of putrefactive germs. The same applies in the case of a deciduous tooth, very little or no cleaning of the cavity being necessary; simply cap the cavity with hydronaphthol and cement and place your filling on the capping to obtain the necessary firmness. This applies also in the case of a hurried filling where the patient cannot spare time for proper treatment. Again, when I find it necessary to extract the pulp, and the patient has probably to leave the same day, after dressing and cleaning out the root-canal, as well as possible, in my limited time, I have filled the canal with a mixture of hydronaphthol and cement, and proceeded with the filling. In no instance has there been further trouble.—A. W. MCCALL, *Federal Dental Journal.*

5484

VOL. XII. DECEMBER, 1906. No. 12

The Dental Digest

A MONTHLY SUMMARY OF DENTAL SCIENCE DEVOTED TO THE PROGRESS OF DENTISTRY.

THE OFFICIAL ORGAN OF THE

Dental Protective Association,
Missouri State Dental Association,
Nebraska State Dental Society,
Rochester Dental Society,
California State Dental Association,
Michigan State Dental Association,
Kentucky State Dental Association,
Southwest Michigan Dental Society,
Northern Indiana Dental Society.

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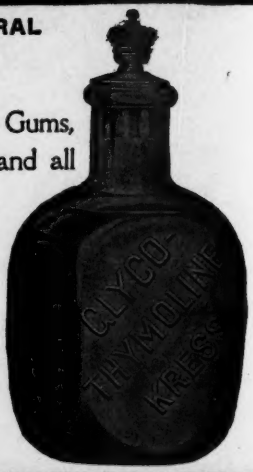

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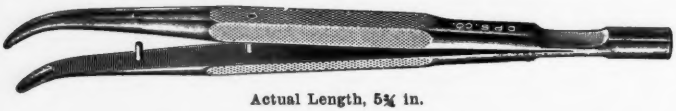

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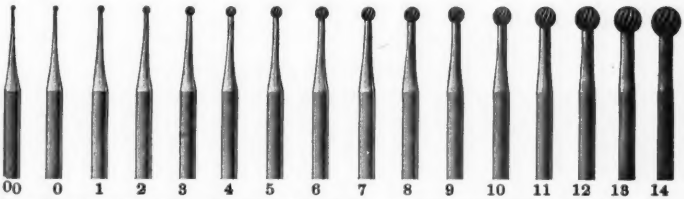

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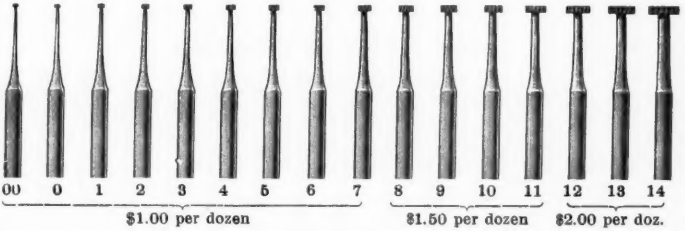

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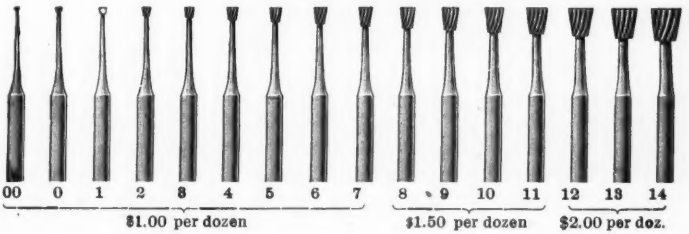

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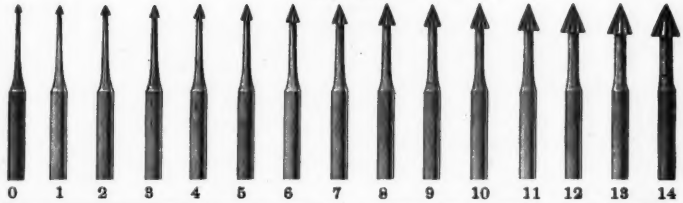

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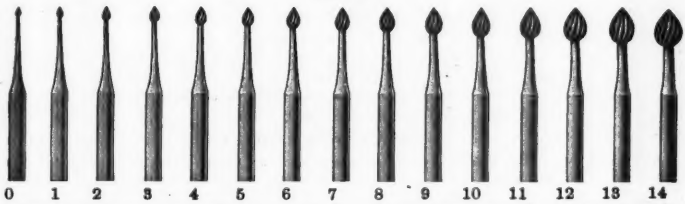

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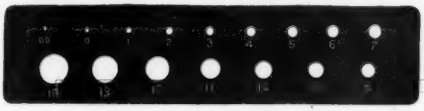

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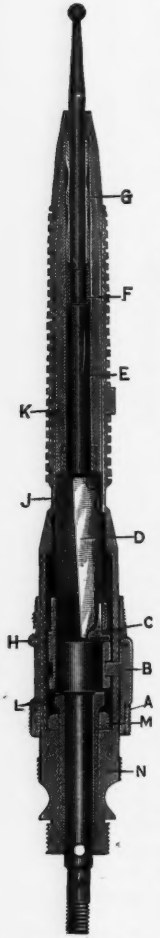

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The "Fellowship" handpiece can be attached to any engine or slip-joint, will hold all burs except the "No. 6," and any angle attachment with universal shaft may be used with it.

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To fasten bur in handpiece. Draw the sleeve H back as far as it will go (which opens the split chuck G), insert the bur in spindle and push the sleeve H forward.

To oil handpiece. Unscrew the milled collar A (giving it about four turns), lift up B and then remove sheath. Lubricate at back bearing L and at coned portion of spindle for forward bearing, and also on sliding collar C. Screw sheath back on collar N, replace B in its seat on H (being careful to see that the small lug on B engages in the groove of C) and screw milled collar A back to place.

To take up wear by tightening chuck. When because of wear, bur is not held tightly, remove outside sleeve H and unscrew the sheath. By taking hold of the front spindle K, where it is flat, and placing flat sided instrument in slot of back spindle J, you can easily unscrew the two spindles. Take out the plunger E, and on small end place a copper washer. Assemble the handpiece, and if bur is not held tightly enough, remove parts as before and add another washer.

To attach handpiece to any engine arm. Place instrument in the hole at end of handpiece to prevent spindle from rotating. Then screw driving spring of flexible wrist onto spindle by turning to the left, and fasten flexible sleeve to handpiece.

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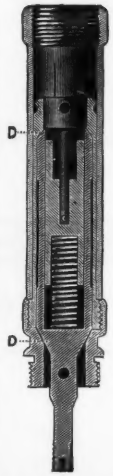
THE FELLOWSHIP
Slip-Joint Connection



The sectional illustration shows the perfect mechanism of this attachment and will prove our claim to having the simplest appliance of its kind.

Unlike the majority of Slip-Joint Connections, the wear in the Fellowship can be taken up by means of the cone bearings at D-D, a feature which absolutely guarantees that this appliance will outwear any other. The double bearings also insure perfect and true running, thus obviating any possibility of the bur wobbling.

All parts are so threaded as to admit of its application to any handpiece, thus making it distinctly universal.

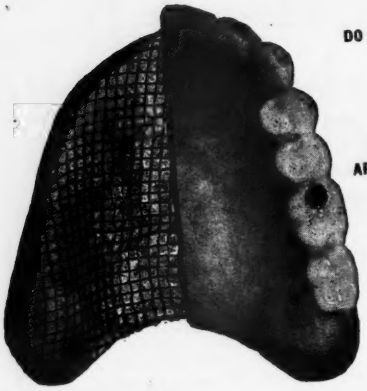
A glance at slip sheath A will show how simple the locking device is and will also furnish another proof of the simplicity of design and mechanism, as there is no awkward spring or lever to obstruct its ready use. In other words it is, as such an appliance should be, a true slip-joint connection.

PRICES: Complete, Parts A, B, C, $5.00; Extra Sheath, A, 75 cents; Extra Dog, C, 25 cents.

Dental Protective Supply Company

1303-6 Heyworth Building, 34 Madison St. CHICAGO

Branch: 818 Real Estate Building, Philadelphia



DO YOU HAVE **FITS** THAT SUIT YOU

OR

ARE THEY THE **FITS** THAT DON'T FIT

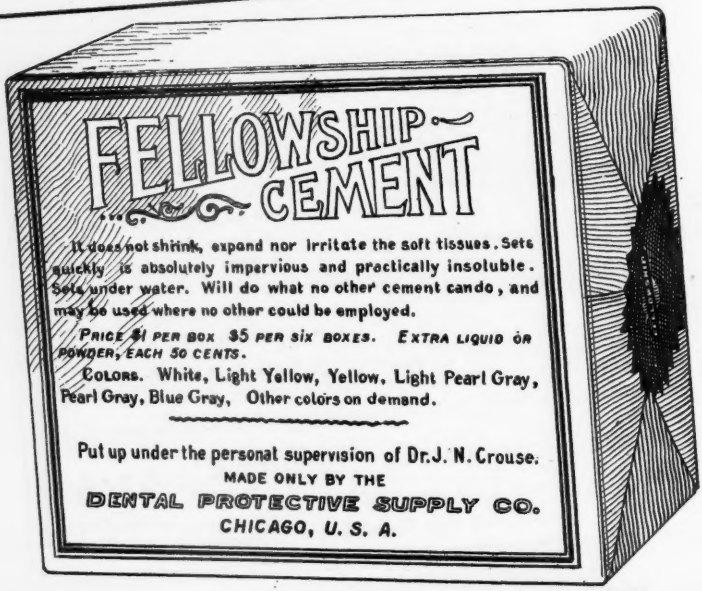
IT IS FITTING THAT YOU TRY OUR

PLATES
CROWNS
BRIDGES
PORCELAIN

Pat. April 14, '06.

SAML. G. SUPPLEE

874 Broadway - NEW YORK


FELLOWSHIP CEMENT
It does not shrink, expand nor irritate the soft tissues. Sets quickly is absolutely impervious and practically insoluble. Sets under water. Will do what no other cement can do, and may be used where no other could be employed.
PRICE $1 PER BOX $5 PER SIX BOXES. EXTRA LIQUID OR POWDER, EACH 50 CENTS.
COLORS. White, Light Yellow, Yellow, Light Pearl Gray, Pearl Gray, Blue Gray, Other colors on demand.
Put up under the personal supervision of Dr. J. N. Crouse.
MADE ONLY BY THE
DENTAL PROTECTIVE SUPPLY CO.
CHICAGO, U. S. A.

Something for Nothing

In this day and age it is unusual and difficult to get something for nothing, but that is practically what you do when subscribing for the DENTAL DIGEST, as the dollar which you pay does not begin to equal the value which you receive.

The DIGEST each month contains original articles of the highest standard, added to which is the department of digests, giving the best of all matter appearing in other dental journals, both domestic and foreign. Still further is the news summary, a monthly feature affording a resume of all news and scientific items of interest to the profession and collected throughout the country. Such a journal is yours for 8 1-3 cents per month. Can you afford to be without it?

Subscriptions Commence Now. Send Yours.

OVER

TO DR. J. N. CROUSE, PUBLISHER OF

THE DENTAL DIGEST

2231 Prairie Avenue, CHICAGO

Please forward the **Dental Digest** to me monthly for the year of 1907, for which find enclosed $1. Please continue sending the journal until otherwise ordered.

Name.....

Street Number.....

City.....

County.....

State.....

(OVER)

FOREIGN SUBSCRIPTIONS, except Canada, Mexico and U. S. Possessions, $1.75

(Dec., 1906.)

¶ In popularity and efficiency, Sanitol Tooth Powder has rapidly become a great cleansing force in modern civilization.

¶ The food we eat—many of our habits of life—are apt to be destructive to the health of both teeth and mouth.

Sanitol Tooth Powder

uniting its *searching antiseptic qualities* with the *production of free oxygen* in the mouth, destroys every vestige of germ life and produces a gleaming, natural whiteness of the teeth. It is cooling and refreshing, a mouth tonic which tastes good long afterwards. Its use will be a pleasant revelation to you—in the immediate results.

Individual package sent FREE for trial. *Regular Size at Your Druggists 25c.*

THE SANITOL CHEMICAL LABORATORY CO. St. Louis, Mo.

True Impressions

ARE ONLY OBTAINED WITH THE
BEST MATERIAL

Fellowship Modelling Compound

IS ONE OF SUCH

It softens readily in hot water and takes a sharp, accurate impression, defining every ruga and line of the denture. Used according to directions it will neither crawl nor become sticky. It hardens quickly and with comparatively no shrinkage. Supplied in two grades, medium and hard, and put up in half-pound boxes.

Price Per Pound, 75 Cents

WAX

In the manufacture of our wax preparations none but the purest of materia is used and they are therefore in popular demand.

Pink Paraffin and Wax, extra tough, for base plates, per box	$0.50
Yellow Wax, for base plates, per box,	.50
Yellow Wax, for impressions, per box,	.38
Sticky Wax, in stick form, for use in crown and bridgework, per box,	.30

Dental Protective Supply Company

1303-6 Heyworth Bldg., 34 Madison St., Chicago
818 Real Estate Bldg., Philadelphia

Operative Instruments

Should have expert attention at regular intervals. Burs need recutting and stoning. Pluggers require reserrating. Excavators and other edged instruments should be overhauled and either repointed or sharpened.

¶It is for such work as the above that we maintain a special department at our factory, and note a steadily increasing demand for the services of our repair experts.

¶It must be conceded that it is better to have a small selected line of operative instruments, in perfect condition for all demands, than an extended outfit the greater portion of which is dull-edged and affords but indifferent satisfaction.

PRICES

Cavity Burs, Recut and Stoned	*Per doz., $0.50*
In six-dozen lots	*" .45*
In twelve-dozen lots	*" .40*
Finishing Burs, Recut and Stoned	*" 1.00*
Excavators Repointed	*Per doz., 75c to 1.00*
Pluggers Reserrated	*Each, 15c to .25*
Mirrors Reglassed	*Each, .50*

Being manufacturers of Handpieces, we are equipped to make a specialty of Handpiece Repairing

To save time send to us direct at Chicago office, and if you so desire we will charge through your own dealer

Dental Protective Supply Company

1303-6 Heyworth Bldg. 34 Madison St., CHICAGO

Branch: 818 Real Estate Bldg., Philadelphia

SUCCESS

can only be measured by results. The results to be desired where cements are used can **only be obtained with**

FELLOWSHIP

It is the one cement equally valuable whether used as a permanent filling, for the setting of crowns and bridges, or porcelain inlays. In addition to these uses many leading porcelain workers keep it constantly at the chair side as an impression material for inlay cavities. Its density, hardness and entire lack of contraction and expansion make it peculiarly adaptable in all these places.

QUALITY, THE HIGHEST, AND ALWAYS UNIFORM, insuring
RESULTS WHICH ARE ABSOLUTELY DEPENDABLE.

One color boxes only, price $1.00, or 6 boxes, $5.00.

Colors: White, Light Yellow, Yellow, Light Pearl Gray, Pearl Gray, Blue Gray.

Manufactured only by

Dental Protective Supply Company,

1303-6 Heyworth Bldg., 34 Madison St.,
CHICAGO.

Branch, 818 Real Estate Bldg., PHILADELPHIA.

Sold by All Reputable Dealers.

YOU NEED

an Electric Mouth Lamp for those dark cavities. We know scores of dentists who bless the day they invested in this outfit.

The D. P. S. Co.'s Electric Mouth Lamp

is simple in construction, neat and compact in design, and withal answers every purpose for which it is intended.

The plug, which admits of using the lamp on any electric-light fixture, also embodies the resistance. The lamp holder is of hard rubber and has midway of its length a small finger contact by which current is thrown on or off. The incandescent lamp, which can be readily replaced when burned out, is enclosed by a metal shield to which is attached an adjustable mirror. All metal parts are nickel-plated and the outfit is supplied with 5 feet silk conducting cord and for attachment to either Edison, Thompson-Houston or Westinghouse sockets. Can be furnished for either 104-volt alternating or 110-volt direct currents.

When ordering please give full particulars as to style socket, also voltage, etc.

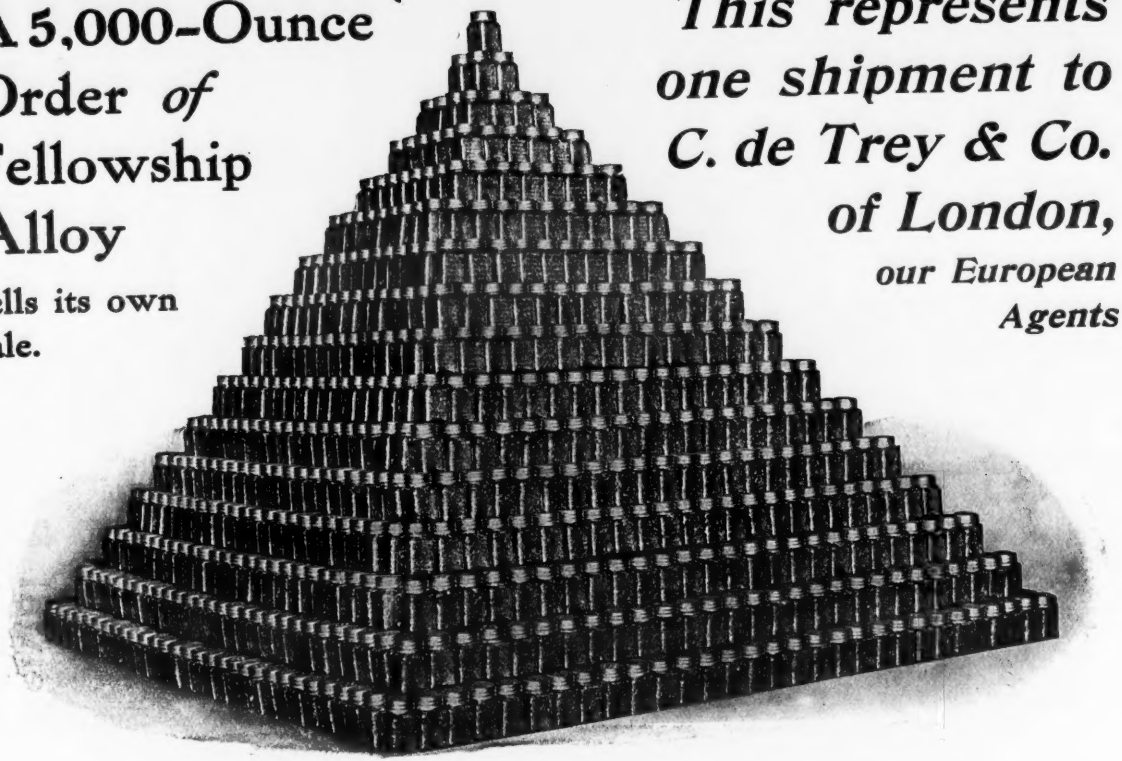
PRICE, COMPLETE, $5.00

Dental Protective Supply Co.

CHICAGO **PHILADELPHIA**

A 5,000-Ounce Order *of* Fellowship Alloy

tells its own tale.



This represents one shipment to C. de Trey & Co. of London,

our European Agents

JUST ONE OUNCE

OF

FELLOWSHIP ALLOY

will bring immeasurable satisfaction to you and your patients.

FELLOWSHIP WAS THE ORIGINAL TESTED ALLOY.

That is, it was the first offered the dental profession for which the claim could be made that it would not contract, but would show a slight expansion ($\frac{1}{2000}$) and always maintain its color, contour and edge strength.

It was made so at that time and has been the same in every particular from that day to this; in other words, FELLOWSHIP is the one absolutely uniform alloy and always will be.

Price, per ounce, $3.00; 5 ozs., $12.50; 10 ozs., $22.50; 20 ozs., $40.

MANUFACTURED SOLELY BY THE

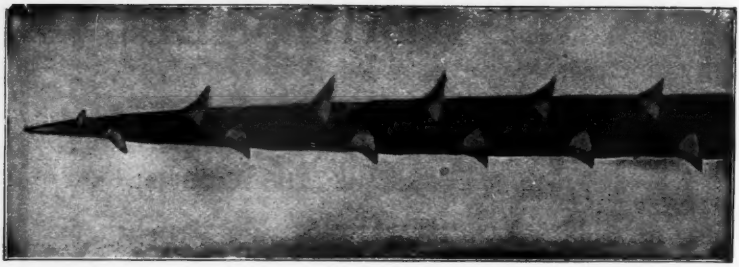
Dental Protective Supply Company

1303-6 HEYWORTH BUILDI[illegible]
34 MADISON ST., CHICAGO

BRANCH: 818 REAL ESTATE BLDG., PHILADELPHIA

A Pointed Question

ARE YOU USING FELLOWSHIP BROACHES?



If not, you will find here appended a few reasons why you should:

First—Being made in our own factory they represent Fellowship quality and are therefore the best.

Second—They are made of a specially selected material in the hands of expert workmen.

Third—Well barbed in four distinct rows, every barb retaining its edge and strength indefinitely.

Fourth—Tempered by a special process, they are rendered tough and elastic but without being in the least brittle.

Fifth—Every broach is tested before leaving the factory

Sixth—They were the first offered the profession at a reasonable figure.

We manufacture in four different sizes, and put them up in packages of six, containing either extra-fine, fine, medium, coarse or assorted.

Price, per dozen $1.00
" " half gross 5.50

Dental Protective Supply Company

1303-6 Heyworth Building, 34 Madison St., Chicago
818 Real Estate Bldg., Philadelphia

FELLOWSHIP
TWIST BROACHES

We have found these broaches to be steadily growing in favor, many practitioners preferring not to use those of the barbed variety. They are made of a particularly tough and yet pliable steel, which allows of being twisted into a spiral form, thus giving a broach which is easily introduced into pulp canals by a rotary motion. By our method of tempering they are practically unbreakable. Another distinct advantage in their use is the fact that they can be used in much smaller canals than is possible with those which are barbed. They are put up in fine, medium, coarse and assorted packages containing one-half dozen.

PRICES:

Per dozen, for use with any style holder, $ 1.00
Per half gross, " " " 5.50

Also supplied in a short length with thumb hold, for use on molar teeth; per doz., $1.50.

Plain Broaches

These are made of the same material as our other styles of broaches, and are largely used for introducing cotton pellets with medicaments into root canals. We can supply in three styles, plain, roughened, or with hook.

PRICE:

Per dozen, any style, - 75 cts.

MANUFACTURED BY

Dental Protective Supply Company

1303-6 Heyworth Bldg., 34 Madison St., CHICAGO

Branch, 818 Real Estate Bldg., PHILADELPHIA

Impression Trays for Full Cases

These trays are made of heavy aluminum plate, and the handles extend well under the sides and are attached by means of three rivets, thus affording trays with almost as much rigidity as those of Britannia metal. It is conceded that aluminum trays are more cleanly and more adaptable, which facts, added to their extreme lightness, make them particularly desirable. Those trays illustrated above are for full cases, either upper or lower.

PRICE, EACH 25 CENTS

Dental Protective Supply Company

CHICAGO **PHILADELPHIA**

Impression Trays for Partial Cases

These trays differ only from those shown for full cases in that they are for partial dentures. Nos. 7 and 8 are designed for impressions for anterior bridges. Nos. 9 and 10 for either right or left, and upper or lower partial cases. No. 11 is intended for use where lower anterior teeth remain in the mouth. No. 12 is designed for wax bite plate.

PRICE, EACH 25 CENTS

Dental Protective Supply Company

CHICAGO **PHILADELPHIA**

MALLETING

by hand has lost much of its vogue in recent years. This fact may be largely attributed to the perfection now reached in the manufacture of mechanical mallets, notably those known as "automatic."

By the use of such an appliance a marked saving of time is effected without lowering in any sense the standard of the work done.

IN THE

Fellowship Automatic Mallet

we draw attention to an appliance which we consider second to none. The construction is simplicity itself, the direct and pull strokes being governed by the same mechanism. All the working parts are carried by the spindle, which reduces the friction. All those parts subject to wear are made of hardened steel. The workmanship throughout is the very best. The mallet gives a uniformly dead blow, the force of which may be varied to suit the needs or wishes of the operator. The adjustment to regulate this is made by turning a knurled thimble at one end.

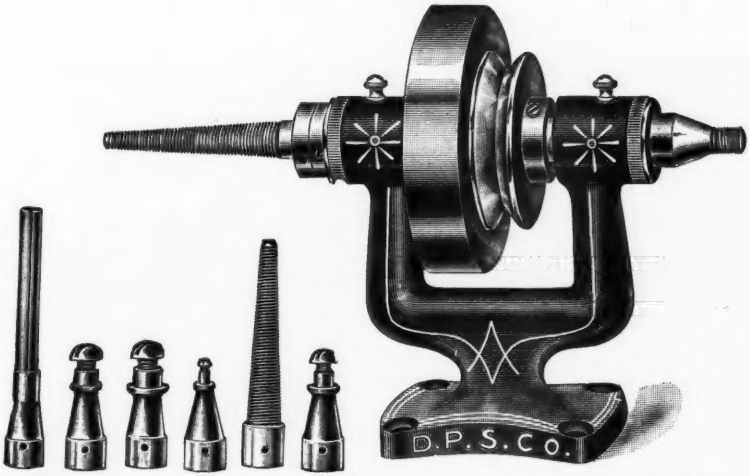
Both ends are drilled to hold either the cone socket or automatic plugger points. The "grip" on either end is covered with black hard rubber.

PRICE, $6.00

Dental Protective Supply Co.

CHICAGO PHILADELPHIA

THE FELLOWSHIP LATHE HEAD AND CHUCKS



This lathe is made on the cone journal principle. ***IT HAS DUST-PROOF CONE BEARINGS and the CHUCKS ARE SELF-TRUING***

The spindle bearing on right side is fixed, while that on the left is movable, so that any wear may be taken up readily. There is a jamb nut to tighten the movable cone when adjustment has been made and to prevent its working loose.

The dust-proof caps prevent grit from working into the bearings and destroying them.

All chucks are self-truing. The hole in each is conical, so that when screwed onto the spindle shaft the chuck seats itself over a corresponding taper, and is thus held in perfect alignment with spindle.

All polished parts are nickel-plated, while the balance is japanned.

Price, complete, with six chucks, $7.00

Manufactured by

DENTAL PROTECTIVE SUPPLY COMPANY

1303-6 Heyworth Bldg., 34 Madison St., Chicago
818 Real Estate Bldg., Philadelphia.

Teeth Saved Every Time

longer than under any other filling if you use the proper kind of gutta-percha in the right places. Our aim was to provide this kind, and we succeeded when we produced

Gilbert's Superior Gutta-Percha

This is hard and is designed for permanent work.

Price per one-half ounce, - $1.00

Gilbert's Nerve Canal Points

These are superior stock, hand-made and of the right size. Our assorted ones fit almost any root canal.

Price per box, - 40 cents

Supplied by your dealer, or we will mail them on receipt of price.

S. Eldred Gilbert

1627 Columbia Ave., E. K. PHILADELPHIA, PA., U. S. A.

TENAX - - - - Ask for Sample

FOR IMPRESSIONS—

Sets quick. Doesn't stick to teeth.
Will not run down patient's throat.
Clean; cuts like cheese.

SAVE MONEY AND YOUR PATIENTS' PATIENCE

TENAX

FOR INVESTMENT—

Dries at once. No time lost.
Blowpipe cannot affect it.
Doesn't check porcelain. Doesn't crack or expand.

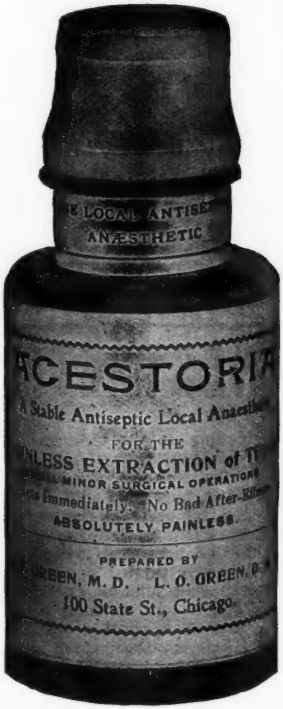
A STAPLE, NOT A PATENT COMPOUND

Ask Your Dealer - - - - TENAX

Acestoria

Combination Pure
Action Always Sure

KEEP THIS FACT IN SIGHT
AND YOU'LL BE AL RIGHT



Two-ounce size, - $1.50

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Dr. L. O. Green

42 MADISON STREET
CHICAGO, ILL.

Bleaching
Sterilizing

SAPONIFYING DEODORIZING

Na_2O_2

DENTAL SODIUM DIOXIDE

in 2-oz. tins at $1.00 del'd from dealers, or

The Roessler & Hasslacher Chemical Co.

100 WILLIAM STREET, NEW YORK

DR. KIRK, Dean of U. of Pa., writes:
"We have found it invaluable not only for bleaching discolored teeth but in the treatment of putrescent and infected conditions of the pulp canal."

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Caveats, Trade Mark, Design-Patents, Copyrights, Etc.

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Fendall Building. - Washington. D. C.

PYORRHEA

Owing to the value of Sal Hepatica in the treatment of diseases of the uric acid diathesis it has been found specially beneficial in pyorrhea alveolaris, a malady in which rheumatism and gout are potent causes. It contains the salts similar to the celebrated Bitter Waters of Europe, fortified by addition of Lithia and Sodium Phosphate. It stimulates liver, tones intestinal glands, purifies alimentary tract, improves digestion, assimilation and metabolism.

Write for free samples.

BRISTOL-MYERS CO.
BROOKLYN-NEW YORK

PYRENOL

Chemical Compound of Salicylic Acid, Benzoic Acid and Thymol

PROMPT AND RELIABLE REMEDY FOR

NEURALGIA

Violent pains that have lasted for days disappear in thirty minutes (Silber and Schlesinger). It is absolutely non-poisonous and does not depress the heart, as acetanilid mixtures do.

Literature and sample-tube of tablets from

SCHERING & GLATZ

58 Maiden Lane, New York

BROCK'S LOCAL ANESTHETIC

COMPOUNDED according to the technique of modern asepsis, this is the cleanest and most effectual local anesthetic made. We boil our bottles and corks, and distill, filter and boil the water we use. Its drug contents are made by the world's best chemists; and our anesthetic is clean enough to inject, if necessary, into the peritoneal cavity. Its formula is non-secret and is printed upon every bottle. It is a distilled aqueous solution, containing ¼ of one per cent cocaine, $\frac{1}{100}$ gr. digitaline to the ounce (an amount designed to support a weak or nervous heart in large injections), the purified active principles of Thyme, Gaultheria, Eucalyptus, Baptisia Tinctoria, Mentha Arvensis, Benzo-boracic Acid and Iodoform. The excellent anesthetic and antiseptic qualities of this combination will instantly be seen by any man who has not read his Materia Medica in vain. To all those who have not yet used this anesthetic we will send our $1.00 bottle, containing full 1½ozs., upon receipt of 50c. Should your dealer not handle it, insist on his furnishing it, or send direct to

WESTERN CHEMICAL CO.

SHELDON, IOWA.

WE BUY

Gold, Platinum

and Alloy Scrap at

best market rates

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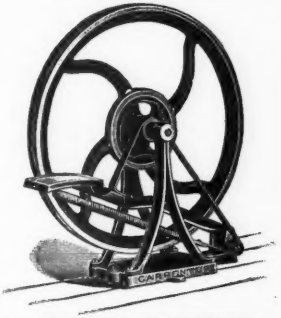
Dental Protective Supply Co.

CHICAGO PHILADELPHIA

THE CARPENTER

Speed Wheels

FOR DENTISTS' USE



A combined MOTOR and FOOT WHEEL and an OCCASIONAL KICK does the trick

Send for Descriptive Circular

THE CARPENTER MFG. CO.

5 Park Sq., BOSTON, MASS.

GOODRICH

DENTAL

Ecru

DAM

The Simon Pure of Rubber Dams

ITS FEATURES: Casts no Shadow; Great Strength, Elasticity and Life; the Real Ecru Color; Translucent; Non-Sticky.

Write for sample and particulars.

THE B. F. GOODRICH COMPANY, Akron, Ohio.

Miller's Local Anesthetic

The only agent in the world that completely fills the long-felt want of every dentist.

A few reasons why you should Miller's Local Anesthetic.
Positively—no sloughing of the gums.
Positively—no irritation or inflammation of the gums.
Positively—no after effects of any kind.
Positively—no depressed feeling after use.
Positively -painless extraction.
Positively the most prompt anesthetic in America, so prompt is it in its action that the patient does not feel the insertion of the needle.

ONCE TRIED ALWAYS USED

"The True Measure of Price is Quality"

1. OZ. - $1.00 6 OZ. - $5 00
12 OZ. - $10.00

MESSRS. MILLER & BLAKE, Adrian, Mich.

Gentlemen:—I have used your Local Anesthetic with remarkable success. I consider it far superior to any I have ever used. By its use, operations in the mouth can be performed absolutely painlessly.

As it does not irritate the gums in the process of injection for the extraction of teeth, the whole operation can be made without any pain. I find your anesthetic so prompt in its action, that the patient does not even feel the insertion of the needle.

I can cheerfully and highly recommend it to the dental profession.

Most respectfully yours,

CHALMER J. LYONS, D. D. S.

Miller & Blake Chemical Co.

ADRIAN, MICH., U. S. A.

ANTIKAMNIA & CODEINE TABLETS

FOR PAIN ABOUT THE TEETH

When to Use Them

FIRST

To ease the nagging and shooting pains while operating; to quiet the nerves, and prevent the headaches and nausea which frequently follow operations, administer one Antikamnia & Codeine Tablet every hour

— GIVE ONE BEFORE BEGINNING OPERATION —

SECOND

One Antikamnia & Codeine Tablet given before and another one after extracting a tooth, will stop pain and allay irritability

THIRD

When a painful cavity exists, or a nerve or root is exposed, administer internally one or two Antikamnia & Codeine Tablets and fill the cavity with the powdered tablet, or apply it freely about the gums

FOURTH

For toothache, earache and facial neuralgia, administer one Antikamnia & Codeine Tablet every two hours

FOR SAMPLES AND LITERATURE, ADDRESS

The Antikamnia Chemical Company St. Louis, Mo., U. S. A.

A FEW OF

The Kotts' Specialties

No. 1. Obtundall for Sensitive Dentine. This is certain in its work and can always be relied upon. Will absolutely not injure the pulp. It absolutely destroys all pain while excavating. It is to be applied to the cavity. Your money cheerfully refunded if not entirely satisfied. Price, **$3.00** for 200 treatments.

No. 2. Kotts' Antiseptic Nerve Canal Points are so medicated and thoroughly incorporated with Iodoform-Creasote and other of the best antiseptics, that when placed in nerve canals they render them perfectly sterile for ever after, and should always be used instead of plain points. We make both medicated and plain, and of white and pink gutta-percha They are round, hand made and are put up in the following forms—Large, Fine and Assorted.
Medicated, per box of 150....**50c.** Plain, per box of 150....**25c.**

No. 3. Mumaline. For mummifying freshly devitalized nerves and filling roots; thereby mummifying fragments of nerves that can not be removed. It contains no glycerine, but is prepared with essential oils and thoroughly incorporated with some of the pine gums, making it absolutely impossible for moisture to enter nerve canals filled with it. Price, per box, **$1.00.**

No. 4. Paraforma, an Abscess Cure. Price, $1.00.

No. 5. Kotts' Tin Cement for Children's Teeth. It lasts four or five times as long as Oxyphosphate. Price, $1.00.

No. 6. Kotts' Crown and Bridge Cement. Two colors. **$1.00.**

No. 7. Zenobia Gold Alloy 66 + Silver. One ounce, **$2.00.** Five ounces, **$7.50.** Seven ounces, **$10.00.**

Zenobia White Alloy. One ounce, **$1.00.** Five ounces, **$4.75.** Ten ounces, **$9.00.**

No. 8. Kotts' Local Anesthetic. Contains no cocaine nor eucaine. **50c.** per ounce.

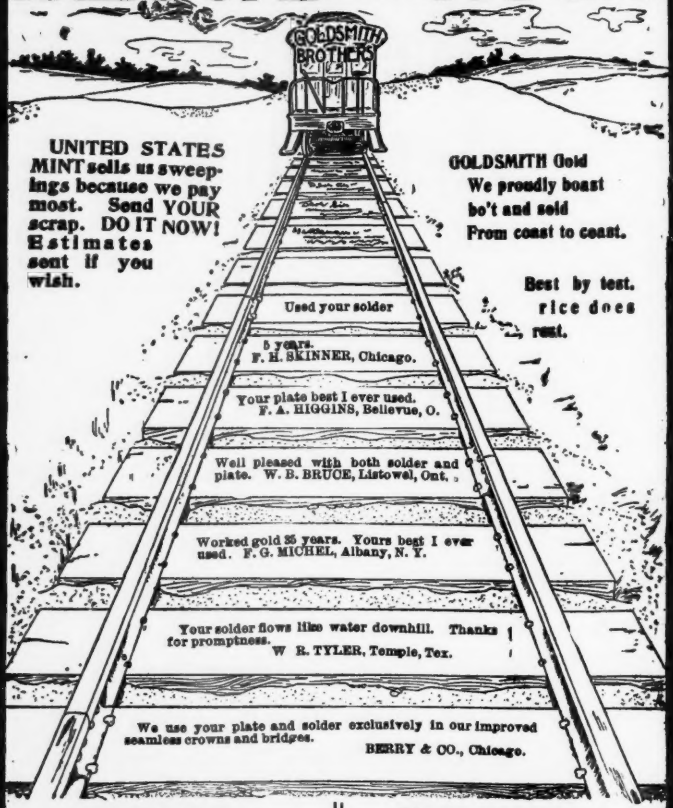
If any of the above articles do not give perfect satisfaction your money will be cheerfully refunded. Order from your dealer or direct from

FRED A. KOTTS, D. D. S.,

REFERENCE—Any Bank in Toledo, Bradstreet or R. G. Dun.

518 Spitzer Bldg., Toledo, Ohio

THE RECORD ON OUR TRAIL


GOLDSMITH BROTHERS
UNITED STATES MINT sells us sweepings because we pay most. Send YOUR scrap. DO IT NOW! Estimates sent if you wish.
GOLDSMITH Gold
We proudly boast
bo't and sold
From coast to coast.
Best by test.
rice does
rest.
Used your solder
5 years.
F. H. SKINNER, Chicago.
Your plate best I ever used.
F. A. HIGGINS, Bellevue, O.
Well pleased with both solder and plate. W. B. BRUCE, Listowel, Ont.
Worked gold 35 years. Yours best I ever used. F. G. MICHEL, Albany, N. Y.
Your solder flows like water downhill. Thanks for promptness.
W R. TYLER, Temple, Tex.
We use your plate and solder exclusively in our improved seamless crowns and bridges.
BERRY & CO., Chicago.
We use no gold but yours.
JESUP GOLD CROWN CO.
Jesup, Ga.
Like your gold better than any other.
H. P. SMITH, Sturgis, S. D.

WE HAVE MANY TESTIMONIALS FROM MANYWHERE—

Canada and every state in the Union—which convinces us that if our products were but given a fair trial we would have

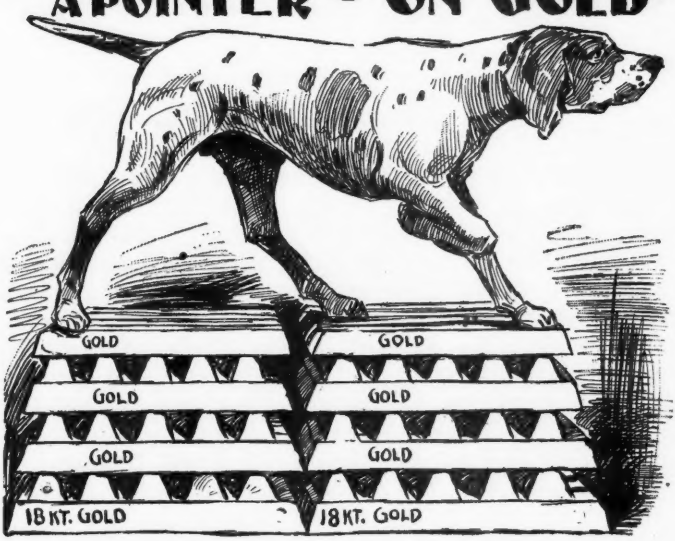
MANY TESTIMONIALS FROM EVERYWHERE.

☞ *Samples of gold solder and other specialties free to any dentist. Write on your office stationery or enclose card.*

GOLDSMITH BROS., ASSAYERS, REFINERS, MANUFACTURERS,

63-65 Washington St., CHICAGO, U. S. A.

A POINTER ~ ON GOLD·



GOLD PLATE This should be absolutely free from flaws, uniform in gauge and fineness, soft and pliable, of good color, and last, but not least, the price must be right. Our plate comes fully up to all requirements.

GOLD SOLDER To insure perfect results in plate and bridge work it is essential that the solder be of the same color as the plate. You take no chances when you use our plate and solder. Our solder does not "ball," and being chemically pure does not oxidize in the mouth. Write for samples.

FILLING GOLD Our foil and cylinders are chemically pure and do not contain carbon and impurities that are at times found in others. They are easily manipulated and our many satisfied patrons say it's hard to break the "Goldsmith habit" when once acquired. Goldsmith foil and cylinders are the lowest in price of any, and the cheapest at any price. Write for samples.

☞ SEE OUR PRICE LIST ON PAGE 45.

GOLDSMITH BROS.,

Refiners and Manufacturers of Dental Specialties,

63 Washington St., CHICAGO, ILL.

NEW YORK OFFICE: 230 Grand Street.

GOLDSMITH BROS.

SMELTERS AND REFINERS

63 AND 65 WASHINGTON ST.

Chicago, April 24, 1903.

DEAR DOCTOR:--

Do you make or use Seamless Crowns? If so we are sure this will interest you. It is a well known fact that no cylinders or ferules can be drawn with uniform thickness by a hand draw-plate, as when driving the disk through, unless held perfectly true (which is almost impossible) the Gold varies in thickness, leaving one side so thin as to make it almost useless. Realizing this, we have gone to a great expense in having machinery made to draw these Cylinders in one operation, so that when tested with a micrometer the disks do not vary a particle.

Another very important point is the Gold used for this kind of work. The ordinary 22-karat gold as used for soldered crowns is not adaptable for seamless work, it being entirely too stiff, and when contoured to the shape required it often cracks, spoiling the work. Our special Gold is very soft and malleable, yet of the required strength to stand the strain, especially in bridgework.

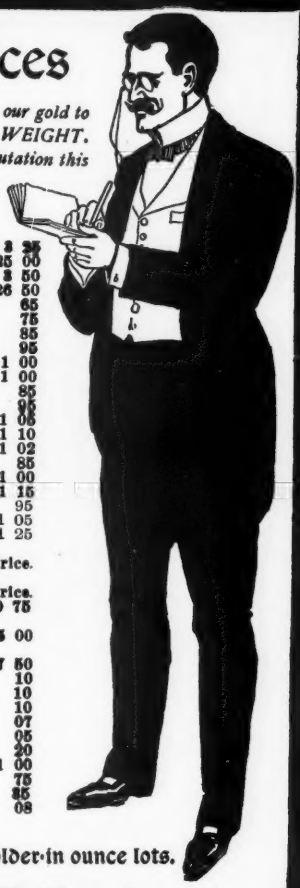
The price of these ferules is $1.05 per dwt. This is a great saving both in time and money, and you have no faulty disks and very little scrap gold. We shall be pleased to mail you free, upon application, one of our sets of fourteen 30-gauge fac-simile copper tubes for measurements.

Yours truly,

GOLDSMITH BROS.

Note Our Prices

and bear in mind that we absolutely guarantee our gold to be of the FINENESS specified and FULL WEIGHT. We mean to continue to uphold the good reputation this firm has enjoyed the past 35 years.



Price List.

Gold Foil, ½-oz.	$ 3 25
Gold Foil, per oz.	25 00
Gold Cylinders, ½-oz.	3 50
Gold Cylinders, per oz.	26 50
14K Solder, per dwt.	65
16K Solder, per dwt.	75
18K Solder, per dwt.	85
20K Solder, per dwt.	95
Coin Solder, per dwt.	1 00
22K Solder, per dwt.	1 00
18K Gold Plate, per dwt.	85
20K Gold Plate, per dwt.	95
22K Gold Plate, per dwt.	1 05
24K Gold Plate, per dwt.	1 10
Coin Plate, per dwt.	1 02
Clasp Metal, per dwt.	85
Clasp Wire, per dwt.	1 00
Platinized Gold, per dwt.	1 15
18K Gold Wire, per dwt.	95
20K Gold Wire, per dwt.	1 05
24K Gold Wire, per dwt.	1 25
Platinum Sheet or Wire, per dwt.	Market Price.
Platinum Iridio Wire, per dwt.	Market Price.
Pure Silver, per oz.	$ 0 75
Columbian Alloy, $2.00 per oz; 3 ozs. for	5 00
65 Silver, 35 Tin Formula, $1.00 per oz.; 10 ozs. for	7 50
Aluminum, per oz.	10
German Silver Plate, per oz.	10
Pure Zinc, per oz.	10
Pure Tin, per oz.	07
Pure Copper, per oz.	05
Pure Bismuth, per oz.	20
Broaches, per doz.	1 00
Burs, per doz.	75
Carborundum Strips, per box	35
Carborundum Disks, per box	08

5% Discount on 22K Gold Plate and Solder in ounce lots.

☞Send us your orders—We'll do the rest

Goldsmith Bros.,

Refiners and Assayers,

63-65 Washington St., Chicago.

New York Office: 230 Grand St.

DR. VEO'S REMEDY

FOR PYORRHEA ALVEOLARIS

OBTUNDENT, HEMOSTATIC AND GERMICIDE

DR. VEO'S REMEDY has no rival, and cannot be imitated

USED

TO STOP BLEEDING IMMEDIATELY
BEFORE excavating a SENSITIVE TOOTH
BEFORE removing any DECAY from CAVITIES
BEFORE removing any DEPOSIT from the TEETH
BEFORE preparing TOOTH or ROOT for CROWN
BEFORE adjusting the RUBBER DAM, CLAMPS or LIGATURES
BEFORE cleaning out the ROOT CANALS of all PULPLESS TEETH

READ WHAT OTHERS SAY

September 23, 1904.

DR. S. H. GUILFORD,
Phil. Dental Col., Philadelphia, Pa.

I am pleased to state that **we obtained good results** from use of **DR. VEO'S REMEDY** in our college clinic last year, and no doubt shall again.

November 1, 1904.

DR. V. J. BAGGOTT,
524 Westminster St.,
Providence, R. I.

I have used about all the preparations on the market, but some **5 years ago**, very luckily, ran into **DR. VEO'S REMEDY.** I have used it ever since, and **am delighted with the results.**

November 9, 1904.

DR. K. L. CLEAVES,
Montpelier, Vt.

I find **DR. VEO'S REMEDY** all that you claim for it. I use it principally **as a hemostatic, at which it has no equal.**

December 1, 1904.

DR. G. P. WIKSELL,
Hotel Pelham, Boston, Mass.

I have used **DR. VEO'S REMEDY** for **over 5 years** at the rate of **12 bottles a year** and regard it as one of my greatest helps **in treatment of chronic abscess** and pus pockets in PYORRHEA. As a styptic after extracting it is also a great help, preventing swelling and soreness. **I have discarded all other treatments for Pyorrhea.**

A real genuine testimonial is a true index of value, and I never publish anything else

Full directions accompany each bottle
Sent postpaid on receipt of price

PRICE PER BOTTLE, $2.00

PREPARED ONLY BY

Charles H. Veo, D. M. D.

74 Boylston St., Boston, Mass., U. S. A.

For Sale by the DENTAL PROTECTIVE SUPPLY CO.

Pointed Screws. Three Sizes.

PLATINOID CROWN PINS.

You can save any kind of a root, and make it useful for a gold crown, by strengthening it with a Crown Pin. They are tapering, with a deep cut thread, and will cut their way into tooth-structure, making a solid foundation to build amalgam or cement around. They can also be used as posts for Richmond and other crowns, as the thread on the pin holds the cement. They are non-corrosive, will not discolor gold. Platinoid Crown Screws are superior to gold screws, as the metal is harder. They can also be used to anchor gold or amalgam fillings, extract roots, etc. We manufacture twenty specialties from Platinoid. Send for new catalogue.

$1.00 per dozen. All dealers keep them. Send to

MANHATTAN DENTAL CO., **New Times Bldg., Broadway and 42d St., New York.**

YUKATOL

For the painless extraction of teeth. This anesthetic is undoubtedly worthy of your consideration. A trial will convince you of its effectiveness. As a special inducement to have you give **YUKATOL** a trial, we have decided to send you a full size 2 oz. bottle **free,** provided you send us 25 cents for postage and packing, also stating that you have never given **YUKATOL** a trial.

The regular retail price of **YUKATOL** is, **2 oz., $1.00; 12 oz., $5.00.**

— MADE BY —

THE YUKATOL MFG. ' ., - Hopkinsville, Ky., U. S. A.

"THE BEST STRIP MADE."

Dr. Howard's Dental Finishing Cloth Strips.

FIRST AND FOREMOST IN THEIR LINE FOR SEVENTEEN YEARS.

Made in four grits—Coarse, Medium Coarse, Medium, Fine, and in three widths—Broad, Medium, Narrow. Put up mixed or separate, as desired, in boxes containing an amount equal to one gross, of medium width, seven inches long. Send for them if your dealer does not keep them.

Manufactured only by

CHAS. T. HOWARD, ROCHESTER, N. Y.

PYO-PLASTIC

THE POSITIVE PULP-CAPPER AND ROOT-FILLER.

Easily Applied with lasting effect.

Destroys Pyogenic Micro-Organisms and prevents their formation.

IN USE OVER SIX YEARS

Full directions accompany each package.

Sent prepaid on receipt of price, **One Dollar.**

Brown's Celebrated *CLEANING FLUID*

Quickly removes Green Stain, Black Tartar and Tobacco Stain from the Natural Teeth Without Injury to the Enamel or Live Tissue.

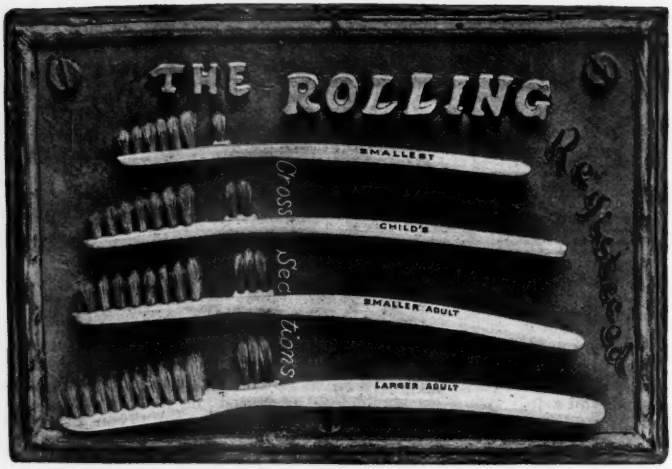
Full directions accompany each bottle,

Sent prepaid anywhere on receipt of price, ***FIFTY CENTS.***

SPRINGFIELD DENTAL DEPOT

DENTAL SPECIALTIES

68 BRIDGE STREET ***SPRINGFIELD, MASS.***



A NEW IDEA, war on large tooth brushes. Four sizes, Larger Adult in two grades, M. S. or S., Smaller Adult, Child's and Smallest, one grade only. See ad. in January, February, March and April '05 Digest. Send $1.00 for the five sample brushes. Send for literature.

D. M. CLAPP, Sole Owner, Box 193, Back Bay, Mass.

IT IS UNIFORM

Another reason why perfect results are always obtained from the use of Dr. R. B. Waite's Antiseptic Local Anaesthetic.

1 oz.	$ 1.00
6 ozs.	5.00
20 ozs.	15.00

Send for literature.

The Antidolar M'f'g Co.,

Springville, Erie Co., N. Y.

This is a cut of one of the Old Things.
Niagara Falls are just as Grand and Beautiful as they were thousands of years ago.

This is a cut of some New Things, that are Relics of the Past.

We only want to put in a word in our defense, as our competitors have been throwing mud.

We insist that the Greatest, Grandest things of the world, yes, of the universe, are old, but being old does not make them relics of the past. *Vesuvius* is old but very much alive.

The *Niagara Falls* while being old are far from being dead, and this great power has recently been harnessed (this is New) and Water Motors did it. Electricity did not have much to do with it, for the electric motors were but the servants to hand out the work of the water motors.

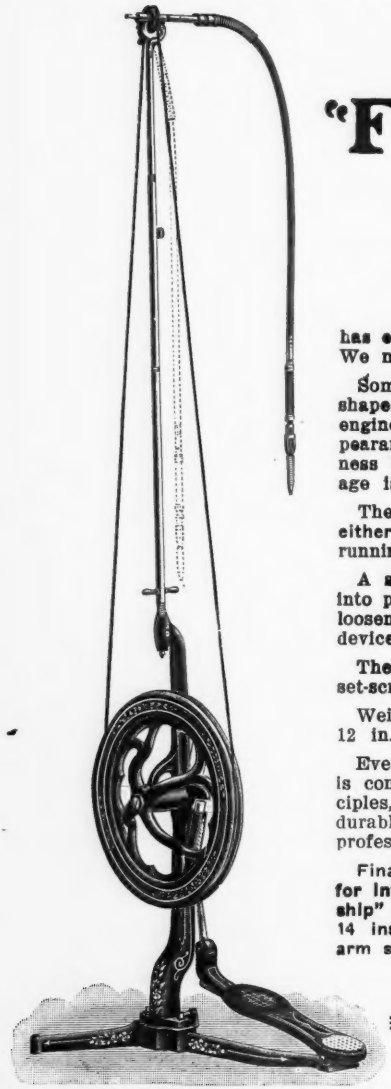
Something of the dangers of this uncanny force—electricity—of which but little is known but its name, will be continued in our next.

The several Sims Engines range in price from $60.00 to $86.00 and we have catalogue and other interesting printed matter which you can have for the asking.

SIMS HYDRAULIC ENGINE CO.

LINCOLN, NEBR.

IT IS CONCEDED THAT THE



Pat. Oct. 12, 1895.

"Fellowship" Engine

has every engine virtue and no engine faults. We make it so.

Some recent improvements, such as the dish-shaped wheel, rigid pitman, etc., make this engine the most artistic and attractive in appearance of any. All points of possible weakness have been strengthened, so that breakage is almost impossible.

The drop pulley-head has long bearings on either side of the wheel, which insure steady running and equal wear at all points.

A slight upward toss of the arm raises it into position and pressure on the thumb-piece loosens. This is the most convenient locking device on the market.

The standard can be raised or lowered by set-screw.

Weight of driving wheel, 13 lbs., diameter 12 in.

Every feature of the "Fellowship" engine is constructed upon correct mechanical principles, and it is the easiest running and most durable article of the kind yet offered to the profession.

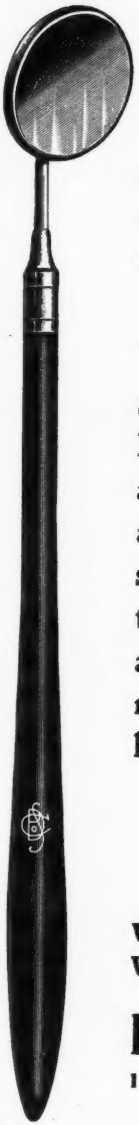
Finally, the price is lower than that asked for inferior engines. We offer the "Fellowship" equipped with our universal handpiece, 14 instruments, oil can, flexible sleeve and arm support for

$33.00

DENTAL PROTECTIVE SUPPLY CO.

1303-6 Heyworth Bldg., 34 Madison St., - - CHICAGO

Branch, 818 Real Estate Buildin Philadelphia



Teeth Reflections

are a most necessary accompaniment of the dentist's profession! Hence the need of a good mirror.

Our dental mirrors are unexcelled. The glass for the lenses is carefully selected and the latter are mounted in heavy german-silver frames, being made as near aseptic as possible. The handles are reinforced where they screw into the socket by means of a threaded metal rod, thus entirely obviating any risk of breakage. Supplied with either plain or magnifying glass and black or white handle.

Sizes as follows:

No. 1, $\frac{3}{16}$ in.	No. 2, $\frac{1}{4}$ in.	No. 3, $\frac{5}{16}$ in.
No. 4, $\frac{7}{16}$ in.	No. 5, 1 in.	No. 6, $1\frac{1}{16}$ in.

PRICES:

With handle, each - - -	$ .65
Without handle - - - - -	.50

Dental Protective Supply Company

1303-6 Heyworth Bldg., 34 Madison St., Chicago
818 Real Estate Bldg., Philadelphia

DAVIDSON HARD RUBBER DENTAL HANDLES

Made of the best materials, and carefully finished.

Screws fit all standard tools.

For sale by all Dental Depots.

DAVIDSON RUBBER CO. - Boston, Mass.

AVOID THE NEEDLE
AVOID ALL PAIN

A very simple proposition, Doctor, if you use **Eureka Obtundent** for all dental and minor surgical operations of mucous surfaces.

It is a perfect anæsthetic, which, when applied to the gums or mucous surface, instantly produces complete anæsthesia. It is absolutely harmless, contains no cocaine (we say this again--**it contains no cocaine**) and avoids all danger of poisoning, slight or severe.

Eureka Obtundent is the only local anæsthetic in the world that can be used without hypodermic syringe or needle. You will find it of wonderful service in your practice.

SEND US ONE DOLLAR

for a one-ounce bottle (enough for 100 teeth); try it, and if it is not satisfactory in every particular, we will refund your money without argument.

Address all orders or requests for literature to the manufacturers,

EUREKA CHEMICAL COMPANY, Omaha, Neb.

PLATINUM

foil and sheet, specially soft.

wire, square or round, specially hard or soft for Dentists.

ware of any description.

We Buy and Refine Platinum Scraps.

AMERICAN PLATINUM WORKS

251 255 N. J. R. R. Ave. - - NEWARK, N. J.

Now Is the Time to Subscribe

FOR THE NEW YEAR

1907

$1.00 **BALANCE OF 1906 SENT GRATIS.** ***$1.00***

Have You Heard About Fellowship "Nuvo" Teeth?

See page 5

WRITE THE MANUFACTURERS

Dental Protective Supply Co.

CHICAGO PHILADELPHIA

MORE CASH FOR OLD GOLD

We Will Give You More in Cash

for your Gold and Platinum scraps and filings than you can get for it in trade.

We have been smelting and refining for twenty-two years, do a very large business and have the most improved and economical facilities for handling Old Gold, Platinum, bench sweeps, etc.

YOU TAKE NO RISK.

We send draft on receipt of every shipment, small or large, and hold same in its exact condition until we hear whether the amount is up to your expectations; if not, we return it, express prepaid. Could any proposition be fairer?

We are sure that if you send one shipment you will send them often.

You can also send us the accumulation of rubbish around your work-bench if you think it contains any gold, and we will give you its value in cash after deducting our small refining charges.

Two Large Refineries.

WENDELL & CO.

93-95-97 William St., NEW YORK. 87 Washington St., CHICAGO.

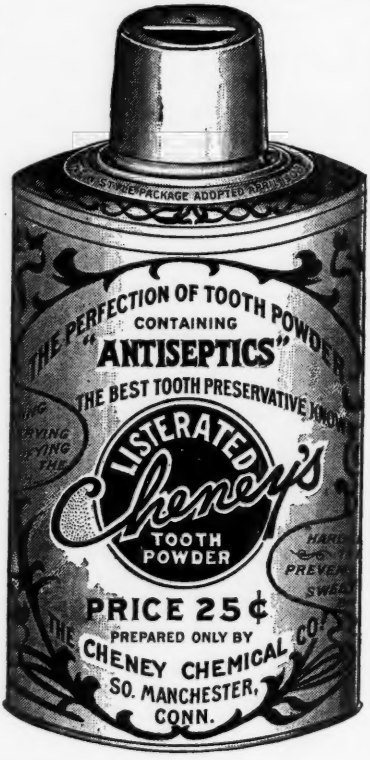
CHENEY'S
Listerated Tooth Powder

has won its popularity with dentists on its own honest merits, and there is no questionable manipulation of stocks in connection with it.

FREE TO DENTISTS

The merits of Cheney's Listerated Tooth Powder are so manifest, and the advantages to the user so positive, that we desire to send gratis, **a full size regular 25c package** to every dentist in America. Simply enclose your professional card and request the gratuitous package.

On sale generally, or can be ordered by mail of the manufacturers,



CHENEY CHEMICAL CO.
BOX 10 SOUTH MANCHESTER, CONN.

If you want to eliminate every element of chance or uncertainty when you purchase foil or cylinder gold — send your orders to

Thomas J. Dee & Co.

Gold Foil ⅛	ounce	$ 3.25
Gold Foil ½	"	12.50
Gold Cylinders ⅛	"	3.50
Gold Cylinders ½	"	13.25

Most all Dentists know of the superior working qualities of our gold.

Thomas J. Dee & Co.

Gold and Silver Refiners - 67-69 Washington St.

Chicago.

A PLACE FOR EVERYTHING

CABINET NO. 75, SQUARE REVOLVING

AND EVERYTHING IN ITS PLACE

This invaluable maxim may easily be practiced and time, labor, money and patience saved by the use of one of our

Dental Cabinets AND Benches

in office and laboratory.

Twenty-five years' experience in manufacturing and the suggestions of some of the most eminent dentists in the country combine to make our Cabinets and Benches the most convenient and practical on the market.

SEND FOR CATALOGUE and LATE SUPPLEMENT

JESSEN & ROSBERG

397 to 405 W. Kinzie St.

CHICAGO, ILL.

Just What You Want

BEST BY TEST

THIS IS $1.00 FOR YOU. CUT OUT this ad and send it to us with $1.00 and we will send you prepaid any two of our preparations you select (once), as a trial will convince you of their superiority. **Send to-day if you want the best.** References, People's Bank of Brooklyn and any dental depot in N.Y. State. Guaranteed by your dealer; the manufacturer is back of him.

When every Dentist who tries it **says so, it must be so**
(That's the best proof)

That Dr. Gilmore's Excel Aseptic Anæsthetic

is the **best** on the market. **No matter what anæsthetic you now buy, try Dr. Gilmore's Excel; you will say it is best and continue to use it,** as others have. **Price,** 2-oz., $1.50; 6-oz., $3.60; 10-oz., $5.00.

We give formulas with all of our preparations

ABCESQUE cures all abscesses and is a fine root-canal filling. **PULPINE** saves pulps, stops hemorrhages and after-pains. **EXCEL DEVITALIZING PASTE** devitalizes painlessly. **LOCALINE** is a local anæsthetic applied to the gums (on cotton). All these are $1.00 each. **Sold by dealers everywhere. Manufactured by**

EXCEL CHEMICAL COMPANY

2228 Fulton Street **BROOKLYN, N. Y.**

THIN • FLEXIBLE

TOUGH • DURABLE

RAPID • CUTTING

SAFE • SIDED

USE • WET OR DRY

WILL NOT • BREAK

THREE • GRITS

FOUR • SIZES

40 CTS. • PER DOZEN

BETTER • TRY THEM

Hall's Carborundum Rubber Disks

For all purposes from finishing Fillings to shaping Crowns and Inlays.

Ask Your Dealer for Them.

WM. R. HALL & SON

115 N. 17th St.
PHILADELPHIA, PA.

Send this "ad" with 10 cts. for samples and booklet of our specialties.

The Standard of Quality

We devote our entire attention to the manufacture of **Gold Fillings.** We make nothing else.

Fine Gold Foil
Pure Gold Cylinders
Pure Gold Ropes
} **⅛ oz. $3.50; 1 oz. $27.00**

Extra Pliable Burnish Gold Cylinders
$\frac{1}{16}$ oz. $2.25; 1 oz. $34.00

Electra Mat Gold
⅛ oz. $4.25; 1 oz. $33.00

Order direct, if not obtainable from your dealer.

Morgan, Hastings & Co.

817-821 Filbert St. PHILADELPHIA, PA.

THE MEDICO-CHIRURGICAL COLLEGE
OF PHILADELPHIA

DEPARTMENT OF DENTISTRY

As a distinct part of the Medico-Chirurgical College the Department of Dentistry offers superior advantages to its students. The clinics of the college present wide opportunities for the practical study of general and oral surgery, as well as supplying abundance of material for practical work in the Dental Infirmary. All of the privileges of the students of the Medical Department of the College are accorded to Dental students. A complete system of quizzing conducted by the professors free of charge, obviates the expense of private quizzing and prepares the students for examination. Illustrated catalogue describing courses in full and containing all information as to fees, etc., sent on request to

I. N. BROOMELL, D.D.S., Dean, 17th and Cherry Sts., Phila., Pa.

Watt's Metal or Fusible Alloy

DENTAL PROTECTIVE SUPPLY COMPANY
WATT'S METAL

A large number of successful dentists are to-day using Watt's Metal for their plate work, and this class of denture is growing in favor with both profession and public.

Plates so made are strong, cleanly, and especially adapted to lower cases where weight is a necessary feature. It is further claimed that a better fit may be obtained than with either rubber or celluloid, and after years of use and exposure to the mouth secretions the denture shows no change in either structure or color. Plates may be made entirely of the metal or on the combination principle of Watt's Metal base and either rubber or celluloid attachment.

Another advantage is that by its use the practitioner is enabled to obtain a considerably higher price for a denture than is possible where rubber or celluloid only is used.

Price, Per Ingot, 50 Cents

MANUFACTURED AND FOR SALE BY

Dental Protective Supply Company

CHICAGO - - - PHILADELPHIA

Realization Burs

do not grind! The steel is specially tempered to a degree that maintains the razor edges in the hardest cutting. The blades are accurately and uniformly cut at the proper angle to shave dentin smoothly and quickly. Their cutting properties obviate the distress which patients suffer from dull, irregular and grinding burs.

They are not surpassed in any single desirable bur quality.

¶ Millions of them used by discriminating dentists have established the fact.

A trial proves it!

Save your handpiece too

The shanks of Realization Burs are true and do not rack the handpiece.

PRICE:

ONE DOLLAR PER DOZEN
TEN DOLLARS PER GROSS

Are you buying your burs right?

Get the sealed package.
For Sale at all leading Dental Depots.

Consolidated Dental Mfg. Co.

NEW YORK PHILADELPHIA CLEVELAND
BOSTON DETROIT CHICAGO

SIMPLICITY

OUR STRONGEST CLAIM

No. 1 Rubber Disc
No. 2 Plunger
No. 3 Jam Nut
No. 4 Valve Top

To unpack the side valve of a Clark spittoon, unscrew number 3; put new rubber washer in place. It takes one minute. Could it be more simple?

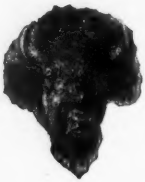
The complete water bowl can only be obtained successfully by using a revolving inner bowl.

A. C. CLARK & CO.

MAKERS

Sold by the Up-to-Date Dealer All Over the World

CHICAGO



THE "WHY" OF IT.

Why do you demand Buffalo Lathes, Pluggers, Furnaces, Blowpipes, Vulcanizers and other specialties for laboratory and operating room? Because you feel that the forty years' experience of the Buffalo Dental Mfg. Co., with all this implies, is behind each article, and each may therefore be put down as the best in its class. In fact, nothing we make is "just like" any other make. There are good reasons for the differences, and the differences are what makes ours better. Vulcanizers, for example: Catalogue "C" describes five kinds, each characteristic of Buffalo specialties, at prices ranging from $12.00 to $30.00. Those differences are plainly set forth in the catalogue, and in addition, it contains a mass of other information you shouldn't be without. Want a copy?

Buffalo Dental Manufacturing Co.

BUFFALO, N. Y., U. S. A.

Stop and Think You want the best

NEW ERA DENTAL FLOSS

(JOHNSON & JOHNSON)

ABSOLUTELY ASEPTIC

In Glass Container with Cutting Device

Here is a new kind of floss, a flat thread with fine corrugated surface; made in a new form; put up in a new and original style package one-half the size of other kinds; each and every feature being an improvement in a material that has known little change or progress in years. Two features that we continue as in our other floss are the highest grade straight silk and pure, old-fashioned beeswax for waxing.

PRICE

12 yd. waxed glass containers, per doz.		$1.25
24 " " " " "		2.00
150 " (in preparation)		

NEW!—LISTER DENTAL FLOSS— ANTISEPTIC MEDICATION

For toilet use by the patient

Thoroughly impregnated with efficient antiseptics, combined with delicate flavoring.
Put up in glass container with cutting device - 15c Each. Doz. $1.50. Gross $15.00

JOHNSON & JOHNSON, New Brunswick, N. J., U. S. A.

DR. DAVIS' NEW COMBINATION SEPARATOR AND MATRIX

PAT. MAY 9th, '05

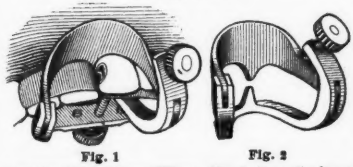


Fig. 1 Fig. 2

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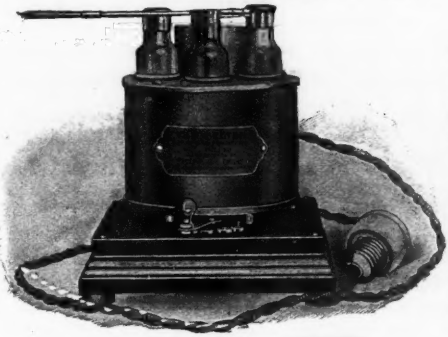

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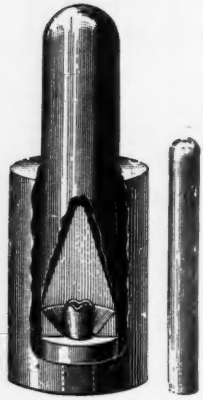

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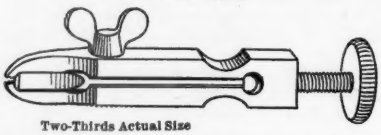

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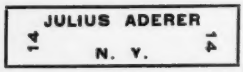

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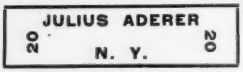

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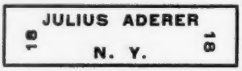

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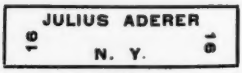

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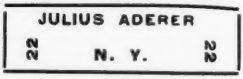

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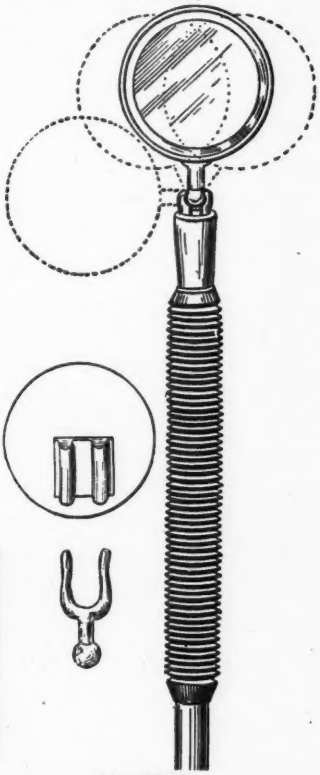

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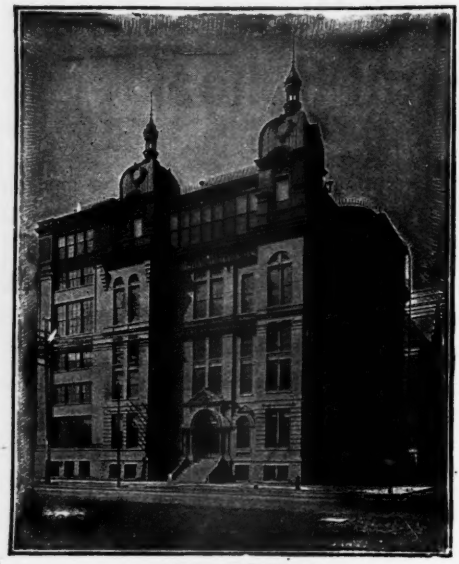

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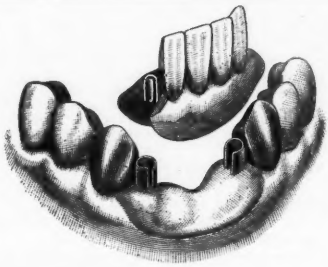

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